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A GARDEN HANDBOOK

FOR SOUTH INDIA

*Based on the
Madras Garden Handbook
by A. J. PLATT*

First published in 1944 by the Madras Agri-Horticultural Society

Revised by
B. A. RAMA RAO

With entirely new sections on
Bougainvilleas, Chrysanthemums, Crotons, Lawns
and Leaf Mould.

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Revised and Enlarged Edition 1955

PREFACE

This revised edition of the *Madras Garden Handbook* has been prepared to meet a long felt demand for the reappearance of a book which has been out of print for several years. The title has been changed to *A Garden Handbook for South India*, because a large area of South India has a climate similar to that of Madras, and gardeners living in or near such places as far apart as Vishakapatnam and Tuticorin will find that the methods recommended in this book will be of great help to them. In fact on the plains of Andhra Desa and Tamil Nad the gardening calendar is roughly the same. In the Hill districts, of course, the climate is very different.

New sections have been added on Bougainvilleas, Chrysanthemums, Crotons, Lawns and Leaf Mould, the first item being based on very long experience at the Adyar Club, Madras.

Some sections of the book will be of great use to those in charge of school gardens, particularly those dealing with soils, fertilizers, vegetables and pests.

B. A. RAMA RAO.

Madras, April 1955.

ACKNOWLEDGMENTS

(FIRST EDITION 1944)

Grateful thanks are due to those who have contributed so much of the material and made so many helpful suggestions that my task has been largely one of compilation.

They are: 'Bougainvillea,' 'Crosslea,' Mr. G. Farley, Mrs. Hugh Fraser, Mrs. J. Fryer, Mrs. T. L. Jackson, the National War Front, Rao Sahib B. S. Nirodi, M.Sc., F.R.H.S., Mr. B. A. Rama Rao of the Adyar Club, Mr. T. D. Srinivasan, M.A., of the Agri-Horticultural Society, Mr. P. S. Swaminathan, F.R.H.S., of the Soundarya Nursery, and the Hon'ble Mr. Justice Wadsworth.

Guindy, January 1944.

A. J. PLATT.

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INTRODUCTION

This handbook is an attempt to bring together under one cover the answers to the commoner questions which confront gardeners in the plains of South India. It is designed primarily for beginners, but it is hoped that others also will find it useful. All the suggestions are based on practical experience and are believed to be workable.

For successful gardening, however, there are two golden rules, perseverance and personal attention, and both should be applied in following out the suggestions. Do not be disheartened if your first efforts are a failure, particularly at the beginning of the gardening season. Keep a record of what you do and note where you make mistakes. Few malis can or will work well unless they are given clear instructions by the owner of the garden and are made to realise that he or she is taking a personal interest in the success of their work. As the old farming proverb has it, 'The Master's foot is the best dung.'

GARDEN DESIGN

Garden design has been the subject of many books, and is so much a matter of individual taste and the particular features of the compound that it is not possible to lay down any hard and fast rules. All that can be done is to state a few general principles and to suggest a few ideas, leaving the garden owner to apply them to his own garden. This section is devoted to general principles, and their detailed application is dealt with in the sections which follow.

The two main objects of garden design are to achieve a natural effect by avoiding the use of too many straight lines, and to keep interest in the garden alive by suggesting, without revealing, something round the corner, just out of sight. Making a garden is not unlike making a pudding. One must have the right ingredients in the right proportion and mix them in the right way. The main ingredients which can be used in making a garden are four: flowers, lawns, hedges and trees. Of these the first two, flowers and lawns, should be used in every garden, however small. Most gardens also have room for hedges and are improved by them, while all larger gardens should contain trees.

Flowers are of two main kinds, annual and perennial. Annuals provide generally the brightest flowers, but bloom only for a season and then die and have to be removed. Perennials or shrubs, though not always so striking in their blooms, live for some years and flower either for the greater part of the year or for some definite season each year. It is best to grow annuals and perennials

together in mixed beds or borders, so that the removal of the annuals after their season is over does not leave the beds entirely empty. It is more effective to have a clump of one colour, both annuals and perennials, and then a clump of another colour, than to mix plants of all the different colours together. White can, however, be mixed profusely with any other colours with advantage, as it enhances the effect of both brilliant and pale colours. Plain green plants, such as cloud grass, can also be used very effectively in small clumps here and there. Most flower colours go well together, but some definitely clash. A safe rule is to follow the order of the colours in the rainbow, red, orange, yellow, green, blue, indigo, violet, or a colour cycle based on the same principle, pink, red, orange, yellow, green or white, blue, purple, mauve, and then pink again. An effect of distance is given by this colour cycle if it is started at the nearer end with pink and finished at the far end with blue, purple and mauve.

There is always a temptation in planting a mixed border to put the big plants in a row at the back, with the medium ones in front of them and the small ones at the front, but the result tends to look rather stiff and formal. A more natural effect can be secured by making the bigger plants come forward at intervals. A simple way of doing this is as follows:—

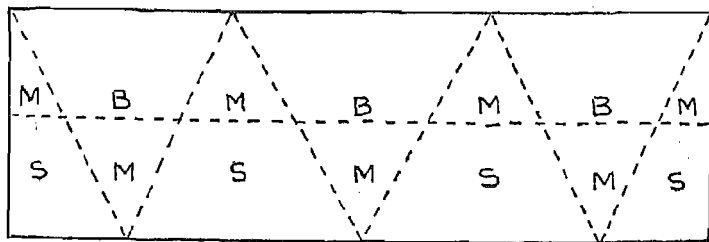


Fig. 1.

When planted the triangles in this design look like waves. The triangular size groups can also be colour groups if desired. Lists of annuals and perennials which can be used in a mixed border are given in the colour charts on pages 51 and 67.

Annuals can be grown in separate beds, planting one variety in each bed. Mixed colours or separate colours can be effectively displayed. Annual beds need not be dug as deep as perennial beds as annuals do not have deep roots. Zinnias, Petunias, Gaillardias, Phlox, Balsam, and Salvias look well in separate beds.

Location of flower beds. Most flowers do best in full sunshine, and benefit particularly from the morning sun. Flower beds should be put in sunny places, preferably where they get morning sun, and if possible, at least six feet from the outermost branches of any trees.

Edging. One often sees beds or borders edged with a long straight line of one variety of plant. The effect of such an edging is neat but it is also formal. A more attractive effect can be achieved by using different varieties of trailing plants. In order to prevent the trailing plants from spoiling the lawn, put a line of crazy paving made of broken pieces of stone, or a brick edging in some suitable pattern such as two pairs lengthwise and one across. This paving or edging should be along the front and sides of the bed, and should be sunk flush with the lawn.

Lawns. Even in the smallest garden the lawn should cover at least as large an area as the flower beds and in larger gardens the proportion of lawns to flower beds should be much higher. Lawns have two main uses, being restful to the eye, and enhancing, by contrast, the brilliance of flower beds. The less a lawn is cut up by flower beds the more restful it is. A few large beds in and round a lawn are, therefore, preferable to many

small ones. Flowers always look more striking when seen beyond a lawn. For this reason, if possible have some grass, even a narrow strip, between a flower bed and a drive.

Hedges have many uses in garden design. They serve to screen off unsightly corners, kitchen premises, ugly walls, and wire fences. In large compounds they define the cultivated area and save it from being merely some flower beds and grass in a large area of compound. In unfenced compounds they protect the garden from cattle. They also serve to divide a flower garden from a vegetable garden. Hedges placed along both sides of a drive in the uncultivated portion of the compound lead the eye on to the house and garden, and thus achieve one of the objects of garden design of suggesting something round the corner, and so adding to the interest of the garden. Flowering hedges are ornamental in themselves, attract the eye, and concentrate interest inside the garden at the point where they are growing. They should not therefore be placed in front of a view. A hedge of plain green foliage is restful to the eye, does not detract from a view and enhances, by contrast, the effect of a flower bed or herbaceous border in front of it.

Trees. No garden is complete without trees, but as they often grow rapidly and become very big, it is essential to plan ahead and not to plant too many. They should not be planted near flower beds as the roots get into the beds. Trees are grown for two main purposes, foliage trees to give shade, and flowering trees for scent or colour. Flowering trees are best grown in the uncultivated portion of the compound, to which they add interest. If grown in the cultivated portion, they tend to detract from the effect of the flowers, but a single flowering tree may be grown as a centre of interest. Foliage trees are useful inside the cultivated portion of the com-

pound, as well as outside it. They are restful in themselves and interesting in a quiet way by throwing shadows on the lawn, besides being useful in providing shade under which the owner can sit and enjoy his garden. Existing trees in a compound are usually foliage trees and can generally be incorporated in the garden design. Never cut down a tree without very careful thought. Design your garden making use of the trees as far as possible.

Centre of Interest. A garden should have one or more centres of interest, for, like a book, it must be about something. The centre of interest may be outside the compound, such as a view, a bridge, a building or a tree. In that case the flower beds should point in that direction by curving away towards it or leading straight to it, e.g., twin borders with a grass path between. There should be no bright colour directly between the observer and the actual centre of interest, but a green hedge or lawn will not distract the eye. Alternatively, where, as is often the case, the surroundings of the compound contain no particular object of beauty, the centre of interest must be inside the compound. It may be something small such as a sundial, bird bath, sunken garden, rock garden or water garden, the other beds being grouped round the edges of the cultivated area. The house itself may be made the centre of interest, and combined with the garden by sinking the drives or raising the lawns so that the drives are hidden, and planting narrow beds of flowers adjoining the house. If the house is raised on a high ugly plinth, a hedge of some flowering shrub such as white or yellow lantana will screen it and serve to link the house with the garden, either by itself, or as the background to a narrow bed.

Paths. Some paths are necessary in a garden to enable the man to water the flowers. It may be possible to put these paths behind the flower beds, in which case

gravel ones will serve. If a path is necessary to lead from one part of the garden to another it can be made much more interesting by using bricks or crazy paving for it. If the mali has constantly to walk across the lawn he will make an ugly track, and he should therefore be given treads on which to walk. These treads can be made of broken pieces of Cuddapah slab or large tiles or groups of three bricks, two lengthwise and one across, sunk flush with the grass, and should be placed at suitable distances apart with spaces of about nine inches between them so that the mali can easily walk on them when carrying full water pots.

Awkward corners. Many gardens contain awkward corners, often under trees, where nothing will grow. It is sometimes possible to exclude these corners from the garden with screening hedges or trellises covered with flowering creepers. If this is impracticable, the usual device is to hide the corner with foliage plants in pots. This is not always satisfactory and a better device is to build up a rock garden or raised bed. If the awkward corner is caused by a greedy tree, such as a tamarind or rain tree, a rock garden should be built up on a foundation of stones and building rubbish (pages 90-92). The entire rock garden should be taken down and remade every year, as the tree roots get through the foundation into it and require to be cut off again. Effective raised beds can be made by building two curved brick walls about two feet high and one foot apart, filling the space with moderately rich soil and planting foliage and shade loving plants in it.

Routine. When you have decided on your design and carried it out, the main thing to do is to keep the whole garden neat and tidy. This involves cutting the lawns, trimming the hedges, weeding and mulching the beds, sweeping the paths, cutting off dead heads, and removing

all dead plants. These are the details which make for perfection, and they are best achieved by having a regular routine for the mali to follow. The afternoons are usually taken up with watering and only the mornings are left for real gardening. But above all a true personal interest by the owner of the garden is necessary. He or she should go round the garden with the mali at least once a day. However experienced the mali may be he will need watching.

SOILS

The preparation of the soil for flower beds varies with the type of soil.

Sandy soil. Dig three feet deep, throwing the soil right out of the bed. Remove all stones and roots and leave the bed exposed to the sun for at least a month. A convenient time to do this is between April and June. Besides manure at the rate of one basket per square yard of bed surface, sandy soil requires additional humus to enable it to retain moisture. This can be provided by adding one or two baskets of leaf mould or half a basket to a basket of tank silt, well powdered, to every square yard of bed surface. The larger quantities are necessary in soils which have become impoverished. Mix the manure, leaf mould and tank silt to form a compost. In remaking the bed put a layer of nine inches of soil into the bottom of the bed, then a layer of three inches of the compost. Mix up the two layers well. Then put another layer of nine inches of soil and a layer of three inches of the compost and mix well, and so on until the bed is full.

Loamy soil. This is usually red. Treat in the same manner as sandy soil except that the compost to be used in remaking the bed should be one basket of manure, one basket of leaf mould or tank silt or both, and one basket of river sand to every square yard of bed surface.

Clay soil. This is generally grey or black. It requires drainage material in the form of building rubbish or stones at the bottom of the bed. Dig three feet deep and raise the surface of the bed a few inches above the

ground level to facilitate drainage. Clay soil also needs to be lightened by the use of lime at the time of digging. Allow eight ounces of lime for every square yard of bed surface. When digging out the bed add a little lime to each layer of soil as it is turned out and fork the lime in. Also add well sifted building rubbish, if available, up to one basket per square yard of bed surface and fork in. Leave the soil for at least a month, and then break it up well by beating with a strong stick. In remaking the bed first put at the bottom a layer of six inches of stones or building rubbish together with the unrotted sticks and leaves of leaf mould which help aeration. Make a compost of one basket each of manure, leaf mould, red earth and river sand to every square yard of bed surface. If you have no leaf mould substitute the same quantity of manure. Then make up the bed in the same way as for a sandy or loamy soil.

A bed made up in this way will last for some years unless it is near trees so that the roots get into it. It should be well dug over each year in the hot weather and exposed to the sun. In clay soils add about two ounces of lime per square yard of bed at the time of digging and fork in. The plant food in the soil will, however, become exhausted and should be replenished at the beginning of the gardening season each year with the same compost as was used for making the bed, but only about a quarter of the quantity then used. The compost should be well mixed into the soil. A small quantity of the compost should also be added between the gardening seasons before planting the cold weather annuals. The soil which becomes surplus through this replenishing can be used as old potting soil for propagation purposes.

MANURE AND LIME

Manure. Although the quantity of manure required can be very greatly reduced by making and using leaf mould, it is not possible to dispense with manure altogether. Horse manure and cattle manure are the two kinds commonly used. Cattle manure, if obtainable, is preferable to horse manure as its effect generally lasts longer, but it must be about a year old and thoroughly rotted. Cattle manure produces good vegetative growth and the addition of horse manure, as liquid manure, when the plants are in bud, gives a stimulus to flowering. Horse manure can be used much sooner but it should never be used fresh. It emits such heat that tender roots will be burnt. If it is very fresh, put it in a heap shaped like an inverted basin, cover it with a thin layer of soil and water it thoroughly once a week for three or four weeks. It will then be ready for use. The best way of finding out if horse manure is ready is to take a handful and press it. If it forms a mould of your palm it is not ready. If it crumbles into powder it is ready. Both types of manure should be well sifted before use to remove the white grubs (like prawns), which breed in manure and are very destructive to plants. The larger pieces of manure can be broken up with a stout stick, and the more powdery the manure can be made the better. The larger pieces which will not break up should be kept in a heap until they have rotted further. Only powdery manure should be used in making up beds. Any manure which is not required for beds should be heaped up and covered with a thin layer of soil to preserve its qualities until it is needed.

Wood ash is also a valuable manure as it contains potash and can be used in any quantity available.

Fowl, goat and sheep manure can also be used, but are about twice as powerful as cattle or horse manure, and less of them is needed. They make good liquid manure.

Chemical manures. There are three main essential plant foods, nitrogen, phosphorus and potash. They are contained in varying degrees in ordinary cattle or horse manure, leaf mould and wood ash. Chemical manures provide them in a highly concentrated form, and are convenient to use. They are not generally used alone, but to supplement ordinary manure and leaf mould, particularly where the quality of the manure is poor or leaf mould is for any reason unobtainable. There is a large variety of chemical manures on the market in normal times at reasonable prices. It is essential in using them to follow the directions carefully and not to apply too large doses, or the results may be disastrous. They are generally composed of one or more of the following ingredients, nitrates, phosphates and potassic manures:—

Nitrates contain nitrogen, the most important of all manure ingredients, which promotes vegetative growth. The common nitrates are given below:—

Nitrate of soda, useful for deep-rooted plants, works quickly and should be applied just before planting out.

Sulphate of ammonia, beneficial to shallow-rooted plants such as grass, works more slowly and should be applied some time before planting out.

Nitrate of lime, acts immediately and is a good top dressing for growing plants. Must be kept dry till needed.

Phosphates contain phosphorus, promote germination, flowering, and ripening of fruit, and are specially

suited for shallow rooted plants. The common phosphates include—

Bonemeal, preferably steamed, slow to act, but good for trees, shrubs and slow growing plants.

Superphosphate, the most widely used phosphate which acts more quickly.

Basic slag, good for grass, and heavy or damp soils.

Mineral phosphate, slower to act and suitable for wet, acid soil.

Potassic manures, containing potash, give tone and vigour to plants and thus protect them against disease. Potassic manures include wood ash, and potash salts, which should be applied some time before planting out, and muriate of potash and sulphate of potash, which can be added at the time of planting out.

Lime is mainly used in clay soils when first digging beds. Subsequently a little can be added every year with advantage. When first digging out a bed sprinkle lime on each layer of soil as it is dug out at the rate of eight ounces for every square yard of bed surface. The mali should tie a cloth round his face when doing this and choose a windless day for it. The lime by chemical action releases much of the plant food in the soil for the subsequent season. Manure or leaf mould should not be added until at least a month after liming, as fresh lime wastes their properties by releasing the ammonia and plant food in them too quickly for the plants to assimilate.

LEAF MOULD

Good leaf mould is a thing one cannot buy. If there is a fairly big compound with trees in it, leaf mould can easily be made.

The general method of making leaf mould is to collect the fallen leaves, garden sweepings, kitchen garbage, etc., in a pit and let them rot slowly. This is a very slow method of making leaf mould and several valuable food elements may be lost in the process.

There is a quicker and more effective way of making a compost, whereby a high degree of heat is produced which will kill the eggs of insects and the seeds of weeds. Another advantage of this method is that manures like sulphate of ammonia and superphosphate may be added in solution to give extra strength to the compost.

Old well-rotted leaf mould left over from last year, if available, is spread on the ground in the form of a rectangle 3' x 6'. Fresh leaves, chopped bits of plants, kitchen garbage, etc., are added to this. A solution of cow dung and water is sprinkled every day till the temperature of the heap rises and the heap is turned over and over. When the temperature of the heap starts falling it is ready for starting another heap, using a portion of the first heap as a starter for the next heap.

Take a quarter of the first heap and spread it separately on the ground. To the three-quarters of the old pile add fresh leaves, etc., sprinkle on it the cow dung solution and turn it over. The temperature of the heap rises again.

The second heap also should be kept moist and turned over.

A third heap is started by taking one-fourth from the second heap and filling the second heap from stuff taken from the first heap, and then making up the first heap with fresh material. Fresh raw materials should be added to the first heap only.

The process is repeated and fresh materials added until all the heaps are of the same size.

The number of heaps depends upon the amount of manure required. The heaps should be kept moist by sprinkling on them a solution of cow dung and water, and artificial manures also may be added if necessary. As the heaps rot less solution will be required; give more to the first heap less to the second, and so on.

The heaps are left for a while for final rotting and fermentation till they form into fine powder. The whole heap is passed through a sieve so that stones, twigs, etc., are removed. It is then ready for use. Always take from the last heap for use and add fresh materials to the first heap. By this a continuous supply of manure is obtained. The last heap will be ready for use in three to four months.

PERENNIALS

Perennials are plants which live for more than one year, and are often called shrubs. There is a very large variety of flowering and foliage shrubs which thrive in South India. The gardener's difficulty, in fact, is not to find shrubs to grow, but to choose from the considerable range available. The commoner ones are given in the charts on pages 54-58.

Propagation. Shrubs are propagated by seed, division, or cuttings. In starting a garden, it is usual to buy young shrubs, preferably in June or July. The easiest method of propagating the different shrubs is given in the chart on pages 54-58.

Seed.—Shrub seeds are sown in the same way as annual seeds (page 59 *et seq.*) Bigger seeds are sown straight into beds. Very hard seeds should be soaked for twenty-four hours before sowing. They can be sown from July to March.

Division may be of roots, suckers, runners, bulbs, corms, tubers or rhizomes. It is done by taking a well established plant and breaking it up at the root or relevant underground formation into two or more parts. This is best done between October and February, and the divided parts kept in pots until they have put on fresh growth. They can then be planted out in the ground, if desired.

Suckers.—Some plants such as lilies, golden rod and snow bush, throw up suckers or runners either round the main plant or at some little distance from it. These suckers can be dug up any time between August and

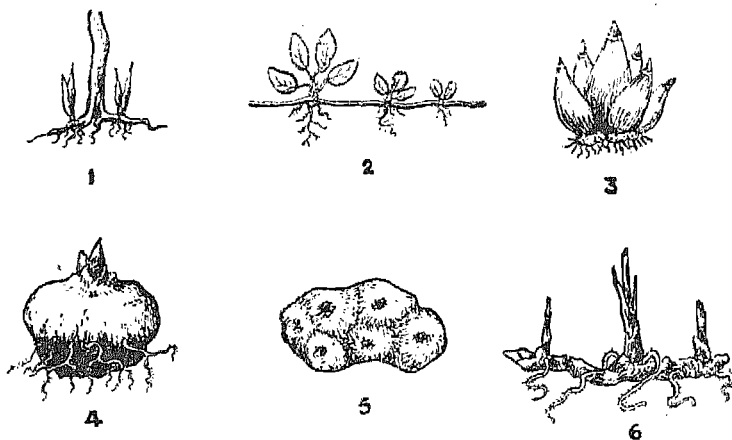


Fig. 2.

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|------------|----------|-------------|
| 1. Sucker. | 3. Bulb. | 5. Tuber. |
| 2. Runner. | 4. Corm. | 6. Rhizome. |

January, potted up till they have grown a little larger, and then planted out.

Cuttings.—In olden days cuttings used to be soaked in cattle urine for 24 hours before planting. Nowadays improved methods have been evolved. The best season to take cuttings is from early August to mid-March, except for succulents such as begonia and coleus, cuttings of which should be taken in October and December. All cuttings should be put down or transplanted in the evening. There are two main types of cuttings, terminal and hardwood.

Terminal cuttings consist of the end of branches containing two or three leaf joints. Make the cut just below a leaf joint, cut off any flowers and strip off the leaves from the bottom leaf joint. Prepare a seed-pan or some 6-inch pots, either of compost as for seed-sowing (page 60), or entirely of coarse sand, but in either case put stones for drainage at the bottom and pieces of broken pot over

the outlet holes. Water thoroughly. Then make holes straight down with a small stick in the soil or sand, and put the cuttings down straight, not slanting, as far as the next to bottom leaf joint. Leave sufficient space between the cuttings so that the leaves do not touch. Press the soil firmly round the cuttings, and keep in the shade, watering daily at midday.

Hardwood cuttings are taken from the older wood of a shrub, which has turned from green to brown or grey, and is about the thickness of an ordinary pencil. These branches contain some leaves, and some little bumps, which are buds or leaf joints. Cut the branches into pieces about six or nine inches long, containing two or three of these leaves or buds. Cut off half of any leaves to reduce transpiration. Make your cuts slanting with secateurs or a sharp knife, immediately above a leaf or bud at the top and immediately below one at the bottom. Take care to keep the cutting the right way up, i.e., the way it grew on the plant. With the knife or secateurs split up the bottom end of the cutting for about half an inch. This helps the cutting to root and also shows which is the bottom end. Prepare a seed-pan of coarse sand as for terminal cuttings and water thoroughly. Make holes with a stick about three inches apart in the sand, slanting at an angle of 45 to 60 degrees to the surface. Put the cuttings in the holes and press the sand firmly around them. Keep in shade, and water daily at midday.

Some of the cuttings will fail to strike, so take about twice as many as you need.

Layering.—Layering is done in cases where cuttings do not take easily. Layering is striking a cutting by allowing it to maintain its connection with the mother plant. By layering we get well established and bigger plants.

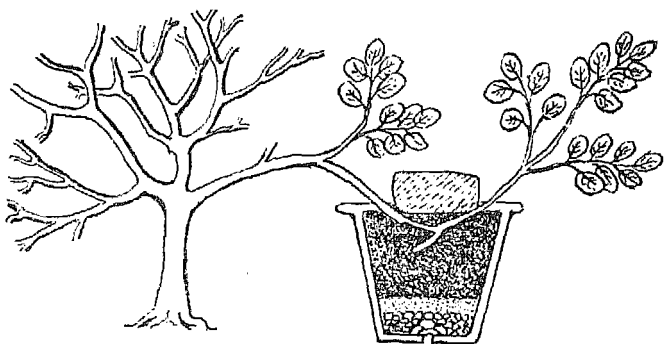


Fig. 3
Layering.

A healthy branch of well ripened wood is selected and bent into the shape of an arc. At the middle of the stem under a node a slit is made towards the plant, like a tongue, and bent carefully. The slit portion is inserted into a small pot filled with a mixture of leaf mould and sand. The 'tongue' should penetrate into the pot to a depth of 1 to 2 inches. A brick or a stone is placed on the stem to keep it well pressed down. In 4 to 6 weeks roots develop when a notch is made on the parent stem above the layered portion. The notch is deepened gradually and eventually cut right through. The portion thus cut off is kept in the same pot till it is well established, and then transplanted into another pot.

Grafting, budding and gootying methods of propagation are also tried, but they are beyond the scope of the average amateur gardener.

Potting up. Cuttings take root and begin to shoot in 7 to 14 days. One month after putting down, they are ready to pot up in 6-inch pots. In taking up the cuttings, be careful not to disturb the soil or sand round the roots if possible. One way of ensuring this is to take them up with a very small trowel. After potting up, cuttings

should be kept in shade and watered daily in the evening, and gradually accustomed to more sunshine. If they outgrow their pots, transplant them into larger ones. They will be ready for planting out in the ground in June or July after the first rains.

Planting out. The best time to plant out shrubs in South India is after the first showers of June or July. They will then have time to grow to a fair size and flower in the first year, and should be able to survive the succeeding hot weather. They can, however, be planted out as late as September or October, and this is the usual time for planting out in places such as Coimbatore and Tiruchirapalli, which experience strong winds in the south-west monsoon period. Late planting involves some risk of loss in the following hot weather, but the risk can be considerably reduced by transplanting the shrubs into larger pots and sinking the pots in the ground. Special care is necessary to see that the shrubs in pots get adequate water. At the beginning of the hot weather the pots should be lifted and kept in partial shade sheltered from the wind through the hot weather and the windy season. The plants can then be planted out in the ground at the beginning of the following gardening season. If shrubs are to be grown directly under big trees, it is best to keep them in big pots all the time, sinking the pots in the ground, so that the roots of the trees cannot rob them of food. The soil in the pots should be renewed once a year, and top-dressed every three months.

Spacing. The commonest mistake made in growing shrubs is to plant them too close together. Choose from the charts on pages 51-53 the shrubs which you want to have permanently, and allow them the spread which they will occupy at the end of their second year as indicated on pages 54-58. While they are growing to this size the intervening spaces can be filled with annuals, or with

shrubs such as pentas or aerva, which are best replaced every year or every two years. Leave some space for annuals even when your shrubs are full grown. The exact proportion of annuals and perennials in a mixed herbaceous border is a matter of taste, and may vary in the different colour groups with the material available. Half annuals and half perennials is a good rough rule.

Pruning is done with two main objects: to improve shape and appearance, and to ensure good flowering. Pruning for shape is done mainly when shrubs are young, but some pruning for this object is necessary throughout their lives. Shrubs should be made to grow evenly and outwards so that they present a neat appearance. Cut off any branches which grow inwards and shorten any which grow much longer than the rest. This enables the sun to get to all the branches. Most shrubs are grown to branch from low down the stem, but some, such as lantana and yellow allamanda, can be more effectively grown as standards. In that case the main stem should be supported by a stout stick to the desired height and all lower branches should be cut off. The plants which are best grown as standards are indicated in the Cultivation Chart on pages 54-58 by the remark 'Standard.'

Pruning for flowering depends on the flowering habit of the shrub. As a general rule, shrubs which flower on old wood should not be pruned severely. All that is necessary is to cut back the branches just behind the flowers each time they cease flowering. If more severe pruning for shape becomes necessary, it is best done in June or July for those which flower continually, or after the flowering season for those which flower at particular times. The shrubs will then come into bloom again in four to six months, or in the next flowering season. There are, however, some shrubs which, though flowering on old wood, require severe pruning once a year after the

flowering season, or in June or July. These shrubs are indicated in the Cultivation Chart on pages 54-58 by the remark 'Prune severely.' Any shrub which flowers on new wood should be severely pruned once a year after the flowering season, or in June or July. If it flowers continually it will come into bloom again in two or three months and for the rest of the year it should be lightly pruned each time the flowers die off. A good way to do this light pruning is to trim the entire bush with a pair of shears. The Cultivation Chart on pages 54-58 shows whether shrubs flower on old or new wood and whether they bloom constantly, or for a season.

Dead-heads. In addition to pruning for shape and flower, it is necessary to cut off all dead-heads of perennials in the same way as for annuals (page 64).

Cultivation. Shrubs should be planted out in the ground in the evening and shaded with leafy branches for two days. Until they start to bloom their main requirements are adequate watering and a weekly mulching of the soil round the roots. One way of ensuring that shrubs get adequate water is to knock the bottoms out of 3-inch pots, sink one in the ground beside each shrub and pour the water into the pot. When shrubs begin to bloom they are benefited by liquid manure prepared in the same way as for annuals, and applied once a week.

Replacement. Although perennials will go on for several years some of them flower best when they are young, and should be replaced when they are past their best. Such shrubs with approximate replacement periods are noted in the Cultivation Chart on pages 54-58.

POINSETTIAS

Poinsettia is a very attractive shrub growing fast to a height of 6-8 feet. Its true flowers are small and inconspicuous, but the bracts are large and leaf-like and colourful. These bracts are the attractive parts of the plant. Poinsettias, if pruned in time, grow into handsome bushes.

Poinsettias can be grown in the ground and in pots. For indoor decoration at Christmas time no other plant surpasses the Poinsettia. There are scarlet, cream, yellow and pink varieties. They start flowering in November and go on till March.

The plant should be cut right back about 9 inches from the ground after flowering is over. It is again pruned in July or August and once more, lightly, early in October. The prunings make the plant bushy in shape. After pruning mix some earth with water into a paste and smear it on the cut ends to prevent them from bleeding. Keep the plants in partial shade until early November and then bring into full sunshine so as to flower. Repot in fresh compost in August every year.

Cuttings of 9 inches in length inserted in sand in August to September will strike roots in about 45 days.

When about to flower, liquid manure is added and the soil hoed up.

HIBISCUS

Hibiscus can be grown in mixed borders or in shrubberies or as individual shrubs along a drive. They require the same general treatment as other shrubs, are propagated from hardwood cuttings, and flower on short stems springing from old wood. They are not very suitable for pot culture.

Common unnamed varieties.—These are of two kinds, single-flowered and double-flowered. The single-flowered varieties are pink, red, schizopetalus (deep cut red petals), white, white with red centre, blue-mauve (*Syriacus*), deep orange with scarlet centre, and mutabilis (white, changing through pink to purple in 36 hours). In the double-flowered varieties the shades are salmon pink, pink, crimson, scarlet, variegated (cream edged pink) and mutabilis. The mutabilis variety grows six to eight feet high in two years and is rather leggy. All the other varieties grow five or six feet high in two years and ultimately reach eight feet. They require replacing in three or four years if grown in borders, and in five or six years if grown elsewhere. *Hibiscus syriacus* differs from the other varieties in producing its flowers straight from the stem in the joints between the leaf and the stem.

Named varieties grow more slowly and reach three to four feet in two years, but ultimately become six to eight feet high. They go on flowering well for a number of years. There is a large number of named varieties, but the most successful in South India are the semi-double and single ones.

Other varieties.—There are in addition many varieties of single hybrids in various shades, most of which have not been named, and which grow like the named varieties.

CANNAS

Cannas are perennials which grow from rhizomes. They are best treated as annuals.

Propagation.—Cannas can be grown from seed but this is very slow, and they are usually propagated by division of the rhizomes. *Dormant rhizomes* can be purchased from nurseries or seedsmen in February and put in pots in sand and watered lightly. They will soon shoot and should be potted up in old potting soil after a month or two, kept in shade and watered twice a week till July when they should be top dressed with manure or leaf mould. Alternatively *growing cannas* can be purchased about July and kept in pots in the shade until August. All cannas should be repotted in August in a compost of one part old potting soil, one part red earth, sand or leaf mould, and one part rotted cow manure. In clay and loamy soils cannas should be put out in the ground in August or September to flower from January onwards. In sandy soils planting out can be delayed till October.

Canna beds.—Cannas are usually grown in beds by themselves but they can also be used effectively in mixed borders. They require very rich soil. The beds should be dug three feet deep and made up in the manner described on pages 16-17 with alternative layers of earth and compost, well mixed together. Use four baskets of leaf mould or manure or both to each square yard of bed surface.

Planting out.—In planting out try not to disturb the roots but to plant the cannas with the soil from their

pots. Cannas should be planted 2 or 2½ feet apart to give them room to spread.

Cultivation.—Cannas should never be pinched out as this stops them blooming. If the end of a shoot has broken off it should be cut down to the ground, unless it is the only shoot, in which case it should be left until another shoot appears and then cut off. Each canna shoot usually produces two flower heads. Some of the flowers die before the others and should be removed in the daily process of dead-heading. When all the flowers of the first head are dead, that head should be cut off and the second left to bloom. When the second flower head is over, if there are no more flower heads, the entire shoot should be cut down to the ground.

Liquid manure.—When cannas begin to bloom they should be given liquid manure like other plants (page 63) and the soaked manure can afterwards be thrown on the canna bed and stirred in next morning in the course of mulching.

Watering.—Cannas require a good deal of water though they do not like being water-logged. They can be watered either in the morning or evening as convenient.

Taking up.—At the end of March or early in April cannas are over and should be taken up. During the growing season the rhizomes grow fresh sections with buds and shoots. Each canna should be dug up, the old parts of the rhizome cut off and the new parts cut up with a sharp knife into sections each containing three or four shoots or buds. The roots should be trimmed and one shoot left growing on each section, which should then be potted up in old potting soil with some sand immediately round the rhizome. The cannas should be kept in shade and watered twice a week until July, then top dressed, and potted up again in August. Some casualties are inevitable during the hot weather but as

cannas multiply themselves fairly quickly, there should still be about twice the number of cannas for the following season.

In places such as Malabar where the rainfall is very heavy, it is not necessary to keep cannas in pots or in shade during the hot weather. They can be taken up when they cease flowering, the old portions cut off and the new sections put down again as soon as the beds are ready. This method is not recommended for Madras.

Edging.—Canna beds look neater if they have a narrow edging of the green spinach plant trimmed into a dwarf hedge about 6 inches high. Pieces of spinach plant about 4 inches long take root easily either in sand or direct in the ground. They can be put down in July and form a good edging in about three months. The plants can be left in the ground, or taken up and kept in shallow beds in the shade through the hot weather and used for fresh cuttings in the following July. It is best to renew the edging every year.

Varieties of cannas.—There are many varieties of cannas in different shades of cream, yellow, pink, red and orange. Different nurseries sometimes call the same canna by different names. The commoner varieties are known only by their colours and grow 4 to 6 feet high.

BOUGAINVILLEAS

Bougainvillea, a genus from South America, is a heavy climber growing rampantly. It is most gorgeous when in flower, and few plants are so colourful and responsive. It is invaluable in providing colour effects in the garden. It flowers right through the year, and more frequently in the dry season. The first specimen of Bougainvillea was collected in Brazil by L. A. de Bougainville on his voyage round the world at the end of the eighteenth century, and it is in his honour that the plant has been named.

Bougainvillea has stipules modified into thorns or spines by the help of which it climbs. The leaves are simple and alternate. What we see as flowers are actually enlarged bracts. This is not uncommon in plant life. In Poinsettia the bract is modified into a bright scarlet or cream coloured long leaf-like structure. This is nature's device for attracting bees and insects for pollination. The true flowers of Bougainvillea are tubular, long and inconspicuously attached to the big petal-like bract. A group of three flowers and bracts joined in a triangular way constitute what looks like a flower. The bracts look like flower petals, while the flowers resemble the stamen and pistils of ordinary flowers.

Bougainvilleas may be divided into two main classes, rampant climbers, and less rampant growers or bushy types. Scarlet Queen, Mrs. Louis Wathen, Purple King, Glabra, Lady Hudson, etc., are of the first kind. Recent hybrids like Refulgens, Magnifica, Rose Queen, Pink

Beauty, Adyar Perfection, Lady Hope, Lady Hall, Rosa Multiflora, etc., are the bushy kinds. One way of finding out whether a Bougainvillea is a rampant climber or a bushy type is by the thorns, the rampant varieties having long thorns while the bushy kinds have less prominent thorns.

One of the varieties newly introduced is the white. Different nurserymen call this by different names. It grows and flowers like the bushy variety but is delicate and therefore requires careful attention.

The propagation of Bougainvillea is mainly vegetative, by cuttings and layering. Few varieties of Bougainvillea form seeds which are collected and sown. These may produce new colours owing to cross pollination. An unexplained phenomenon occurs in plant life as a result of which also new varieties come into existence. The variety, Mrs. Louis Wathen, is such a freak. Cuttings of the rampant climbers of Bougainvillea take root easily while bushy kinds are rather delicate and have to be layered, or propagated in hot cases.

Bougainvillea can be grown in different ways:—in pots; in the ground as shrubs; as standards; on pergolas, arches, posts or fences; along walls; as hedges; up trees, and in other ways.

Bougainvilleas have small roots and are therefore well suited for growing in pots. They can be grown with greater advantage in pots than in the ground because they do not require much water. Also, watering can be better regulated in pots than in the ground as there is always the possibility of moisture in the ground. It used to be the custom of many a gardener to train Bougainvilleas in pots on a bamboo frame-work specially made for the purpose. This method is out of date and rather untidy. Bougainvillea can be grown, like any other bush, in a pot or in the ground without any support.

1. *Pot Culture*.—To start a *Bougainvillea* in a pot, take a young plant with some branches and put it in an eight inch pot. When the branches are mature and become woody, cut them back about four inches from the first fork. Each cut shoot will produce more shoots. These again, when mature, should be cut back. In this way a number of shoots grow, making the plant bushy. At this stage transfer the plant into an eighteen inch pot.

If a standard is to be made, select a plant with a long central shoot and put it in an eight inch pot. Stake the plant and train the shoot to grow straight up. Remove any side shoots immediately they start growing. When the central shoot grows up to the required height, nip the tip off. Small side shoots appear at the top. Cut all these shoots again when mature. By pruning several times a round shaped top is obtained. At this stage transfer it to an eighteen inch pot.

While we are on the subject of ' *Bougainvillea* culture in pots,' let us see how best they can be grown and made to flower. This can be done by *systematic pruning, discriminate watering and timely manuring*.

Bougainvilleas are climbers, and if allowed to, will grow all the time. In pots they should not be allowed to grow as they please. Both rampant and less rampant kinds can be grown in pots. In the resting period watering should be sparingly done. By resting period is meant the time in which they are not in flower. The resting period for *Bougainvillea* varies according to each variety. Heavy climbers like Scarlet Queen and Mrs. Louis Wathen rest for four months. In this period they are not regularly watered, a pot full of water for four *Bougainvilleas* once in 10 days will do. The plant will wither and drop its leaves and look as if dead. If the plant does not wither quickly enough, it may be necessary to remove the top soil up to 6 or 8 inches, and expose some of the

roots to the sun for a few days. After approximately two months water again profusely. Small shoots appear at each node which develop into flowers, and the whole plant will become a mass of bloom.

When small shoots appear, top dress the plant with manure, and also add a handful of bone meal, and then hoe up the soil. If thick watery suckers appear, it is a sign that the plant is getting too much water and this should be curtailed. The suckers must be entirely removed. Watery suckers are distinguished by their thickness, and the greater distance between the nodes. The suckers will only grow at the expense of the plant and they will never flower. When a Bougainvillea finishes flowering, the flower shoots must be pruned to keep the plant in shape. This pruning has to be done as and when the plant gets out of shape. When small flower buds appear, stop pruning and start watering once every day, half a potful for each plant. The plant should be cut right back once a year in July.

Shrubby varieties of Bougainvilleas are not so hardy as climbing varieties and their resting period also is shorter. Therefore the process of withholding water for four months does not apply to this variety. Watering should be done every fourth day, a potful for four Bougainvilleas. The plant might droop but it should not drop its leaves. Watch for small floral buds at each node and then water profusely. Top dress the plant with manure and bone meal and it will burst into flower. By this method it is forced to be dormant and the energy is stored for production of more flower than leaf. There is another advantage in this, we can make a Bougainvillea flower at the time we want it to and also we can have a rotation of bloom. When 25 pots are resting, another 25 are about to come into flower, while a third lot are in full flower. In this way we can have

Bougainvillea in flower all the year round. Bougainvilleas in pots have to be repotted once in three years with fresh manure, and roots carefully pruned. Keep the repotted plants in the shade until they recover. Bougainvilleas that are resting do not present a pleasant appearance in the garden and should therefore be removed to a place where they are not seen, and brought back when they come into flower again.

2. *Shrubs and Standards*.—Bougainvilleas can also be grown in the ground as shrubs or as standards. For this purpose the rampant varieties are not suitable. As there is moisture in the ground it is not possible to regulate water supply to the plant. To make a shrubbery, an elevated space is required. Before the holes are dug for a shrubbery, mark out the positions by placing bricks irregularly 4 feet apart. Straight rows look like a plantation and the mass effect is lost. Holes 2 feet square and 3 feet deep are then dug. These should be kept open for a week and filled up to 6 inches with brick rubble at the bottom covered with 6 inches of river sand. The remainder of the hole should be filled with manure and soil. A shrubbery looks most attractive if pruned so that the plants in front are short, growing gradually taller to the rear. It is much nicer to grow the shrubs in grass and cut neat square beds for each shrub. It is not advisable to make the beds round as it is not easy to keep a perfect circle.

Bougainvilleas in a shrubbery must be watered every alternate day in winter, and daily in summer till they have all grown to the required height. After that water once in fifteen or twenty days in winter, and once a week in summer, when the plants are not in flower. When small flower buds appear at each node, water every day for a week, and once in three days afterwards.

Standards or shrubs on the edge of a lawn, or on either side of a road or drive, look very attractive.

Bougainvilleas in the ground develop more watery suckers, owing to moisture, than those in pots. These must be watched and cut off promptly.

When a Bougainvillea has finished its resting period and is about to flower, top dressing with manure and bone meal is necessary. Remove the top soil to a depth of six inches and add fresh manure, and sprinkle a handful of bone meal round each plant.

3. *Pergolas*.—A double pillared pergola, forming a covered walk leading into the garden, is an attractive feature. This can be made of strong wooden posts but, since Bougainvillea is a heavy climber, by the time it covers the pergola the wooden supports may rot and decay. It is therefore better to use iron posts or cement concrete pillars, with iron angles on top.

All the rampant varieties of Bougainvillea are best suited for growing on pergolas. A mixture of colours rather than one variety will look more attractive.

Prepare a hole, as suggested before, at each pillar and plant a Bougainvillea with a single shoot. Train this shoot up till it reaches the edge of the pergola roof, then cut the end so that it branches freely and covers the roof. Any shoots that appear on the main stem below should be cut off. Water the Bougainvillea every day till it completely covers the top. Then the shoots that finish flowering should be promptly cut off, keeping the pergola in shape.

4. *Arches*.—An arch is a small section of a pergola with four posts. The top of the arch can be flat, round or dome shaped.

5. *Posts*.—Electric or telephone posts standing in any part of the garden are unsightly. A wire mesh can be wound round the post and a bushy kind of Bougainvillea grown on it. After pruning several times the Bougainvillea gives the appearance of a thick pillar.

6. *Fences*.—A natural fence round a bungalow is preferred to a brick and cement wall. No other creeper is better suited for such fence-work than Bougainvillea, as it has thorns which give protection. Strong cement posts with barbed or ordinary wires stretched across will form a suitable support for the Bougainvillea. The creeper must be grown along the first row of wires from the ground horizontally, and then slowly trained up. If this is not done it will be impossible for the climber to fill the lower parts of the fence. The fence will have to be pruned regularly, shaping like a wall. Unless it is pruned regularly the fence looks untidy; if neglected it becomes top heavy and eventually collapses.

7. *Trellis*.—To hide a manure heap, or nursery portion, or servants' quarters a trellis is most useful. In the same way as for a fence put in posts of the required height, but instead of barbed wire, wire-mesh may be used. Alternatively ordinary wire can be run across in strands about a foot apart.

8. *Against a wall*.—Bougainvillea clipped close and grown on the walls of a house gives an added beauty both to the house and the garden. Run wires across on nails embedded into the wall one foot apart, or stretch a wire mesh. The wire or the mesh should stand at least $1\frac{1}{2}$ inches away from the wall, so that the climber can go through freely.

Of the shrubby kinds of Bougainvillea, *Glabra* is best suited for growing on a fence, trellis or against a wall. These are planted in prepared holes 3 to 4 feet apart. The shoots of the plants have to be trained along the wires horizontally, starting with the first wire from the bottom.

If the shoots are allowed to trail upwards it will be impossible to cover the bottom part of the fence. When the shoot grows to about a foot long it must be cut

to induce branching. By constant pruning the Bougainvillea grows thick and when it is in flower it is a gorgeous sight. On a fence or on a trellis it should not be allowed to grow more than 9 inches thick.

Hedges.—Some varieties of Bougainvillea owing to their compact growth can be grown as hedges. Pink Beauty, Refulgens, Rose Queen, are best suited. Out of these three, Refulgens is the best but all the three varieties can be grown if mixed effect is desired. These hedges grow thick by frequent pruning and need no support. Pruning should be done whenever the hedge grows out of shape unless flower buds appear. The whole hedge when in flower will be a mass of colour.

9. *On top of trees.*—If there are any trees of considerable age in the compound, which do not have any attractive flower, they can be made to look colourful by training a Bougainvillea to climb up to the top of the trees. The Bougainvillea will not injure the host tree. Scarlet Queen, Mrs. Louis Wathen, Purple Prince, Lady Hudson and Glabra are the varieties to grow on trees.

Manure.—We will now see what manure should be given to Bougainvilleas and in what proportions. 2 parts well rotted horse manure, 1 part well rotted leaf mould, and 1 part river sand mixed with a handful of bone meal is a good mixture for Bougainvilleas. One important thing to note is that horse manure should never be used fresh. (See page 18.)

Bougainvillea is a hardy climber and fortunately is not susceptible to pests or disease. But we find some Bougainvilleas becoming pale and the leaves turning yellow. This is due either to water-logging or root disease. In any case the plant needs to be repotted into a light mixture containing more sand and kept in the shade.

Let us repeat some of the important points about Bougainvillea culture.

Bougainvilleas require plenty of sunshine, thorough drainage and little water. The watering varies according to the varieties. Immediately after a plant has finished flowering it should be pruned to shape. Once every year the plant is cut back. This induces more flowers. Top dress with manure when about to flower. Prune the roots carefully and repot with fresh manure once every three years. Water shoots must be promptly cut off.

Remember, the secret of success is in *systematic pruning, discriminate watering and timely manuring.*

CHRYSANTHEMUMS

Chrysanthemums if grown properly give a fine display of flower and colour. It is possible to make them do well on the plains of South India.

Chrysanthemums can be grown from seed but take a long time to germinate and also will not flower till the second year. It is therefore advisable that amateurs do not attempt raising Chrysanthemums from seed. It is better to purchase well established plants or rooted cuttings from a nursery. Chrysanthemums do better in pots than in the ground. They flower from November to January. They must be cut back immediately after they cease to flower. They will soon throw out suckers, or offshoots, and these are used as cuttings. The off-shoots away from the main stem are best suited for cuttings and give more satisfactory results. Out of all the offshoots only the strongest should be selected for cuttings. The lower leaves of the shoot are carefully removed and three or four leaves left at the top with the apex. The cuttings have to be put $1\frac{1}{2}$ inches deep into a bed containing

2 parts sand
1 part leaf mould and
1 part soil.

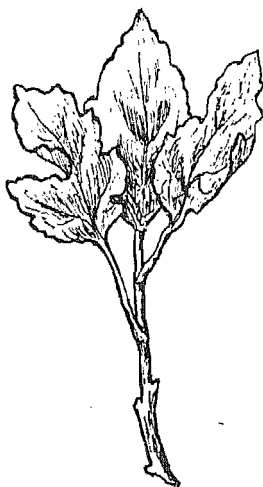


Fig. 4
Basal cutting

The cuttings root in about a month when they are ready to be put into small seedling pots.

Good drainage is essential for Chrysanthemums and therefore sand of thick grain should be used. Otherwise the soil in the pot will cake. Pieces of broken brick also should be put below the potting mixture to ensure good drainage. It is a good thing to raise the pots off the ground on some bricks.

Chrysanthemums by reason of their continuous growth require repotting from time to time; each time with a bigger pot and richer compost.

Chrysanthemums require morning sun in preference to evening sun. They do not like full sun all day long. A south or south-east situation is best for plants in pots.

First potting.—Late in January or early in February the cuttings are put into seedling pots with a compost of:

- 1 part sand
- 1 part leaf mould and
- 1 part soil.

The soil round the stem is pressed down. Watering should be done carefully; not too much.

Second potting.—In April or May, repot them into 5 inch pots with a compost of:

- 1 part sand
- 2 parts leaf mould
- 1 part soil.

While transferring the plants into bigger pots the ball of earth round the roots should not be broken. If the plants have grown rather tall, staking may be necessary.

Third potting.—About June or July re-pot in 6 inch pots with a compost of:

- 1 part sand
- 2 parts leaf mould
- 2 parts soil.

Fourth and final potting.—Late in August re-pot in 8 or 10 inch pots with a compost of the following:

- 1 part sand
- 1 part leaf mould
- 1 part well rotted cow manure
- 1 part soil.

There is no need for further re-potting and the plants can now be left to flower.

Potting a number of times is very beneficial to *Chrysanthemums* as it checks growth and conserves energy for flower production.

Chrysanthemums should be watered carefully; once a day in the evenings will do. Leaves turning pale yellow are a sign that the plant is getting too much water or poor drainage.

Chrysanthemums have their roots near the surface. Therefore when forking this should be borne in mind lest the roots are damaged or exposed.

After the last potting is over and when the plants are established, liquid manure should be given once in ten days. Occasional application of superphosphate mixed at the rate of half an ounce in a gallon of water will help flowering. Damp the soil in the pot before liquid or chemical manures are applied. All manuring should be stopped when buds are about to open.

Chrysanthemums have heavy heads of flower and therefore must be staked promptly. Stakes should not be longer than, or stand out from, the plant. Plants which are allowed to grow with a single shoot are easier to stake. But other plants with a number of branches should be staked on four sides and a thin string tied round to hold the branches in position.

Disbudding of Chrysanthemums is an important operation. Disbudding increases the size of the remaining flowers. It has to be done systematically and carefully.

A Chrysanthemum shoots straight up and when it attains a certain height a bud appears at the apex of the shoot. When this appears the plant will not grow further and the side shoots break into active growth at the axils of the leaves, and therefore this bud is called 'Break.' The side shoots develop and make the plant bushy. These side branches when grown long enough will also have buds. These buds are called 'Crown buds.'

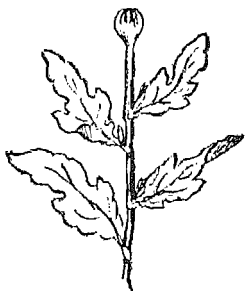


Fig. 5

Crown bud.

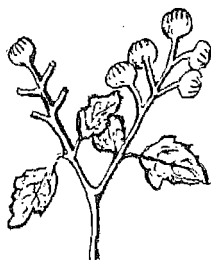


Fig. 6

Terminal cluster disbudded
leaving one bud.

When the crown buds appear the branches also in their turn throw shoots at the axils and they also produce buds which are called 'second crown.' Clusters of buds appear at the end of the side shoots and these are called 'terminal buds.' With the formation of the terminal buds the plant's growth is arrested for that year. Break bud, crown bud, and second crown will have only one bud at the end whereas the terminal buds will have clusters of buds at the end.

Selection of buds for flowers.—Florists call the selected buds 'taken' which means the buds left to flower.

'Break' buds are removed because they mature too quickly when the plant is still young. Out of the several buds in the cluster of terminal buds, side buds are removed and the central bud is taken.

How buds are 'taken'.—There are three ways of taking. The first is to allow the first crown buds to flower. The second is to make the second crown bud flower and the third is to allow the terminal buds to flower.

(1) In the first method the 'break' bud is pinched off and the side shoots are allowed to flower. The shoots further down, that are not required, are gradually removed. The selected shoots will grow healthily. When the first crown buds form, the shoots round them start growing. These also should be removed one after the other within a week. Now the plant will have only first crown buds.

(2) In the second method, crown buds are to be encouraged and the rest removed. By this there will be more flowers than by the first method, but only one flower at the end of each branch.

(3) The third method is to allow the terminal buds to flower. First and second crown buds are removed and terminal buds are allowed to flower. In the cluster of terminal buds the central bud is taken and the rest removed.

Stopping.—There is another florist's term, 'stopping.' It is nothing but cutting or heading back the central stem to make the plant branch more and become bushy. By this the plant becomes mature and flowers more quickly. Flowering is also regulated by this method. Stopping should not be done more than twice, as the plant may die of shock. Further, stopping should never be done just before or just after the plant is re-potted, lest it dies of double shock.

CROTONS

Crotons used to be popular garden plants. They are often called the Aspidistras of the East. But they are not found in many modern gardens.

Crotons are improved variegated *Codiaeums*, the leaves of which are attractive, brightly coloured and of various shapes. They are easy to cultivate on the plains, but will not thrive in hill stations. There are many new varieties introduced recently. They are better suited for growing in pots than in the ground. In a mass effect they are most effective.

Crotons are mostly propagated by cuttings and layering. Seeds are also collected and sown but it takes more than two and half years for them to grow to a reasonable size. The advantage of growing from seed is the chance of getting new colours by cross pollination. Terminal cuttings about 8 inches long with the apex will take root if put into a bed or seed pan. Propagation will be quicker if the cuttings are kept in a propagating case (Hot case). Layering of course, is a much quicker way (pages 25, 26).

Crotons do well in a place where they get morning sun. They do equally well in full sun. In a few days the leaves get scorched by the heat of the sun, but later adapt themselves. If kept in the shade the leaves will be green all the time. In summer when the sun is too hot they have to be kept in the shade.

Crotons require well drained soil. Addition of lime will improve the colour of the leaves. Measure 3 parts

red earth, 3 parts horse manure (well rotted), 2 parts river sand and 1 part leaf mould.

The common pests of the croton are thrips, the mealy bugs. Spraying with fish oil soap will check these pests.

GERBERAS

There are two varieties, single and double. The latter does not flower so well on the plains. Gerberas require light and fairly rich soil with good drainage.

Gerberas like semi-shade, preferably the morning sun and an elevated place, such as a rockery or hollow wall.

Gerberas cannot stand frequent shifting. Those in pots flower better when pot-bound.

As Gerberas are plants whose leaves start from one point, 'the crown,' it is advisable to keep the crown free from soil near or around it. Otherwise the leaves rot and decay.

If there is no proper drainage the leaves of the plant turn pale yellow and die.

The dead flowers must be removed unless purposely kept for seed collection.

Propagation is by division of the plant and by seeds. For Gerberas fill a seed pan well above the rim and heap up the compost, made as for other seeds, into a dome. Get the seed as fresh as possible, preferably straight from the plant. Each gerbera flower turns into a 'clock,' but only contains a few, two to six, true seeds which are thicker than the others. Make small holes with a stick and put in the seeds leaving the fluffy end exposed. Water very gently to avoid washing the seeds out. When gerbera seedlings are potted up in small pots, care is necessary to see that the soil does not get into the centre of the seedling and cause rot. The centre should be brushed clean about once a week.

Colour Chart of Perennials.

Size.	Pink.	Red.	Orange.	Yellow.	Remarks.
<i>Low</i> (under 18 inches).	Asystasia	Begonia	Crossandra	Asystasia	
	Begonia.	Eranthemum.	..	Crossandra.	
	Belopetone.	Euphorbia.		Lantana	Plants marked * are
	Crossandra.	Perennial Salvia.		depressa.*	of special merit.
<i>Medium</i> (18 inches to 3 feet).	Zephyr Lily.			Golden Rod.	Plants marked † have
	Poinsettia	Asclepias	Clerodendron	Zephyr Lily.	coloured foliage.
	Pentas carnea	Justicia.	..		Plants marked ‡ have
		Malpighia.	kaempferi.	Galphimia nitens	scented flowers.
<i>Fairly tall</i> (3 to 4 feet).		Plumbago rosea.*		(Canary Bush).*	
		Poinsettia.			
	Barleria*	Achania*	Hibiscus*	Hibiscus*	
	Hibiscus.*	Clerodendron			
<i>Tall</i> (4 to 6 feet).	Malpighia.	Pyramidalis.			
	Starhytarpeta.*	Dianthera nodosa.			
	Teroma rosea.*	Hibiscus.*			
		Pentas*			
		Pomegranate.			
		Russelia			
		floribunda.			
		Russelia juncia			
		(Coral plant).			

Colour Chart of Perennials—cont.

Size.	Pink.	Red.	Orange.	Yellow.	Remarks.
<i>Tall</i> (4 to 6 feet).	Lagerstroemia.* Lantana. Lemonia.* Snow Bush.†	Isora. Jatropha. Lantana.* Lemonia.	Tecoma capensis* (Cape Honey-suckle).	Lantana.* Lawsonia. Mussaenda luteola Tecoma smithii.	Fuller names are given in the cultivation chart on page but it is safer to specify the colour as well, when ordering.
<i>Very tall</i> (6 to 8 feet).	Bauhinia rosca. Dombeya. Oleander.	Oleander	Caesalpinia (Peacock flower).	Caesalpinia (Peacock flower). Oleander. Tecoma stans. Tithonia tagetiflora.‡	
Size.	Blue.	Purple.	Mauve.	White.	Remarks.
<i>Low</i> (under 18 inches).	Commelina	Asystasia Angelonia cubensis.* Eranthemum laxiflorum.	Asystasia Lantana Sclo- wiana.	Angelonia cubensis.*	
<i>Medium</i> (18 inches to 3 feet).	Dadalacanthus. Plumbago.* Salvia azurea. Salvia uliginosa.	Angelonia grandiflora.*	Angelonia variegated.* Pentas (deep and light mauve).*	Regonia. Malpighia. Orthosiphon. Tuberose. Turnera. Wandering Jew. Angelonia grandiflora.* Clerodendron macrophyon. Pentas.* Plumbago.*	Plants marked * are of special merit. Plants marked † have coloured foliage. Plants marked ‡ have scented flowers.

Colour Chart of Perennials—cont.

Size.	Blue.	Purple.	Mauve.	White.	Remarks.
<i>Fairly tall</i> (3 to 4 feet).	Clerodendron ugandense. Ichroma. Stachytarpetta (pale blue).	Stachytarpetta	Franciscea Hibiscus.	Clerodendron nutans. Gardenia.* Hibiscus.* Panax.† Tabernaemontana.	For varieties of Hibiscus—please see page 31.
<i>Tall</i> (4 to 6 feet).	Duranta Meynia (pale blue).	Barleria Cestrum. Meynia. Petrea.	.. Lagerstroemia.*	Acrua tomentosa.* Barleria. Brunfelsia. Cestrum.† Duranta. Ixora. Lagerstroemia. Meynia. Myrtle. Mussaenda. Portlandia. Snowbush.†	For reasons of space full botanical names cannot be given in this chart in all cases.
<i>Very tall</i> (6 to 8 feet).	....	Allamanda purpurea.	....	Bauhinia Dombeya. Murraya exotica (China Box). Oleander. Oncoba.	

Cultivation Chart of Perennials.

Name.	Colour.	Height in feet.	Months to reach height.	Spread in feet in 2 years.	Cultivation.	Method of propagation.	Flowers on old/new wood.	Flowering period.	Replacement.	Remarks.
<i>Acalypha</i> ..	Red ..	5	6-12	4	Easy ..	H	.. Foliage. ..	..	No	.. Liable to plant-lice and beetles.
<i>Achania</i> ..	Do. ..	4	6-12	5	Do. ..	H	.. Old ..	Always.	No	.. Prune severely every year.
<i>Acua tomentosa</i> ..	White..	4-5	6-12	4	Do. ..	S	.. New ..	Do. ..	1 year.	..
<i>Allamanda</i> ..	Yellow.	4-5	12-24	5	Do. ..	H	.. Do. ..	Do. ..	No	.. Standard — Prune constantly.
<i>Allamanda purpurea</i> .	Purple.	6-8	12-24	5	Do. ..	H	.. Do. ..	Do. ..	No.	..
<i>Angelonia cubensis</i> .	Varied.	1-1½	6-12	1½	Do. ..	DT	.. Do. ..	Do. ..	1 year ..	Prune constantly.
<i>Angelonia grandiflora</i> ..	Do.	2-2½	6-12	2-3	Do. ..	DT	.. Do. ..	Do. ..	1 year ..	Do.
<i>Asclepias</i> ..	Red ..	2	6-12	2	Do. ..	SH	.. Old ..	Do. ..	No.	..
<i>Asystasia</i> ..	Varied.	1-1½	6-12	1-2	Mod. ..	T	.. New ..	Do. ..	2-3 years.	Liable to catch pillars.
<i>Barleria</i> ..	Do. ..	4	6-12	4	Easy ..	HT	.. Do. ..	Nov.-Feb.	No	.. Prune severely every year.
<i>Bauhinia</i> ..	Pink ..	6-8	24-36	3	Mod. ..	S	.. Old ..	Always.	No.	..
<i>Begonia</i> ..	Varied	1-2½	6-12	1	Do. ..	T	.. New ..	Do. ..	1-2	.. Semperflorens — one foot high.
<i>Beloperone</i> ..	Pink ..	1	6-12	1-1½	Do. ..	T	.. Old ..	Do. ..	2-3 years.	..
<i>Brunfelsia</i> ..	White.	4-6	24-36	3-4	Easy ..	HS	.. Old ..	Nov.-Feb.	No.	..

Caesalpinia (Peacock Flower) ..	Varied.	6-8	12-24	6-8	Do.	..	HS	..	New	..	Always.	No.
Canary Bush ..	See Galphimia Nitens.											
Cape Honeysuckle.	See Tecoma Capensis.											
Cestrum diurnum.	Purple.	4-6	6-12	4	Easy	..	S	..	New	..	Nov.-Feb.	No
Cestrum nocturnum	White.	4-5	6-12	5-6	Do.	..	H	..	Do.	..	Always.	No
Clerodendron ..	Orange.	2-3	24-36	2-3	Mod.	..	H	..	Old	..	Do.	No
Clerodendron ..	White.	2-3	6-12	3	Easy	..	H	..	New	..	Do.	No.
Clerodendron ..	Do.	3-4	24-36	2-3	Diff.	..	Su.	..	Old	..	Nov.-Feb.	No.
Clerodendron ..	Red	3-4	24-36	2-3	Easy	..	Su.	..	Do.	..	Always.	No.
Clerodendron ..	Blue	3-4	24-36	2-3	Diff.	..	H	..	Do.	..	Nov.-Feb.	No.
Commelina ..	Do.	1	4-6	2	Easy	..	DSS	..	New	..	Always.	1 year.
Coral Plant ..	See Russelia juncea.											
Crossandra ..	Orange.	1-1½	6-12	1½	Easy	..	S	..	New	..	Always.	1-2 years.
Do. ..	Yellow.	1-1½	6-12	1½	Do.	..	S	..	Do.	..	Do.	No.
Do. ..	Others.	1-1½	6-12	1½	Do.	..	S	..	Do.	..	Do.	No.
Daedalacanthus ..	Blue	3	12-24	3-4	Mod.	..	H	..	Old	..	Mar.-June.	No
Prune severely every year.												
Dhoby Bush ..	See Mussaenda.											
Dianthera nodosa.	Red	3-4	12-24	2-3	Easy	..	H	..	Old	..	Nov.-Feb.	No.
Dombeya ..	Varied.	6-8	24-36	5-6	Mod.	..	H	..	Do.	..	Nov.-Feb.	No.
Duranta ..	Do.	5-6	12-24	4-6	Easy	..	H	..	Do.	..	Always	No.
Eranthemum ..	Red	1-1½	6-12	1½-2	Do.	..	T	..	Foliage.	..	..	No
Eranthemum laxiflorum ..	Purple.	1-1½	24-36	1-1½	Do.	..	T	..	Old	..	Always.	No.
Euphorbia ..	Red	1	24-36	1-1½	Do.	..	H	..	Do.	..	Do.	No.
Francisca ..	Mauve.	3-4	24-36	3	Do.	..	H	..	Do.	..	Aug.-Feb.	No
Likes semi-shade.												

Method of propagation.—H = Hardwood cuttings; T = Terminal cuttings; S = Seed; SS = Self-sown Seed; D = Division; Su = Suckers.

Cultivation Chart of Perennials—cont.

Name.	Colour.	Height in feet.	Months to reach height.	Spread in feet in 2 years.	Cultivation.	Method of propagation.	Flowers on old/new wood.	Flowering period.	Replacement.	Remarks.
<i>Galphimia nitens</i> (Canary Bush)	Yellow.	3	12-24	2	Do.	S	New	Always.	2-3 years.	
<i>Gardenia</i> ..	White.	3-4	24-36	3	Do.	H	Old	Do.	No.	
<i>Golden Rod</i>	<i>See</i> Solidago.									
<i>Hamelia</i> ..	Orange.	4-6	12-24	4-5	Easy	H	Old	Always.	No.	
<i>Henna</i> ..	<i>See</i> Lawsonia.									
<i>Hibiscus</i> ..	Varied.	3-6	12-24	3-4	Mod. or Diff.	H	Old	Always.	<i>See</i> page 31.	
<i>Holmskioldia</i>	Red	4-6	24-36	4	Mod.	H	Do.	Nov.-Apr.	No.	
<i>Ichroma</i> ..	Blue	3-4	24-36	2-3	Diff.	H	Do.	Always.	2-3 years.	Likes semi-shade.
<i>Ixora</i> ..	Orange.	4-6	24-36	2-3	Do.	H	Do.	Do.	No.	
<i>Do.</i> ..	Red	4-6	24-36	5-6	Easy	H	Do.	Do.	No.	
<i>Do.</i> ..	White.	4-6	12-24	5-6	Do.	Su.	Do.	Do.	No.	
<i>Do.</i> ..	Yellow.	4-6	24-36	2-3	Diff.	H	Do.	Do.	No.	
<i>Jatropha</i> ..	Red	4	12-24	2½	Mod.	HS	Do.	Do.	No.	
<i>Justicia coccinea</i>	Do.	2	12-24	3	Easy	H	Do.	Nov.-Feb.	No.	
<i>Kopsia</i> ..	Pink	4-6	24-36	3	Diff.	H	Do.	Always.	No	Likes semi-shade.
<i>Lagerstroemia</i>	Varied.	4-6	24-36	4	Mod.	H	Do.	Apr.-Sep.	No	Needs rich soil. Prune three times severely every year
<i>Lantana depressa.</i>	Yellow.	1-1½	6-12	2	Easy	H	New	Always.	3-4.	
<i>Lantana scellowiana.</i>	Mauve.	1	6-12	2-3	Do.	HT	Do.	Do.	2-3.	
<i>Lantana (others)</i> ..	Varied.	4-6	6-12	4	Do.	H	Do.	Do.	3	Standards.
<i>Lawsonia (Henna).</i>	Yellow.	4-6	12-24	4-5	Do.	S	Old	Do.	No.	
<i>Lemonia</i> ..	Red	4-6	24-36	3	Do.	H	Do.	Do.	No.	

Melphighia	..	Varied.	2	24-36	2	Mod.	H	..	Do.	..	Do.	..	No.
Meyna	..	Do.	4-6	12-24	4	Easy	H	..	New	..	Do.	..	No.
Muraya exotica	..	White.	6-8	24-36	4	Mod.	S	..	Old	..	Do.	..	No.
Mussaenda (Dhoby Bush)	..	Varied.	4-6	12-24	4	Easy	H	..	Do.	..	Do.	..	No.
Myrtle	..	White.	4-6	24-36	2-3	Diff.	H	..	Do.	..	Nov.-Feb.	..	No.
Oleander	..	Varied.	6-8	12-24	5-6	Easy	H	..	Do.	..	Always.	..	No.
Ocoba	..	White.	6-8	12-24	4-5	Do.	H	..	Do.	..	Do.	..	No.
Orthosiphon	..	Do.	1½	6-12	3	Do.	T	..	New	..	Do.	..	1-2.
Panax	..	Gray	3-4	12-24	3	Do.	H	..	Foliage.	..	..	..	No.
Peacock Flower	..	See Caesalpinia.											
Pentas	..	Red	3-4	12-24	2-3	Mod.	H	..	New	..	Always.	..	No.
Do.	..	Others.	2-3	6-12	2½	Easy	TS	..	Do.	..	Do.	..	1-2.
Petrea	..	Purple.	5-6	24-36	3	Mod.	H	..	Old	..	Sep.-Apr.	..	No.
Plumbago	..	Varied.	2-3	24-36	2½	Do.	T	..	Do.	..	Always.	..	No.
Plumbago rosea	..	Red	2	12-24	3	Do.	T	..	Do.	..	Nov.-Feb.	..	No.
Poinsettia	..	Varied.	2½-3	6-12	2-3	Do.	H	..	New	..	Nov.-Apr.	..	No.
Pomegranate	..	Red	3-4	12-24	3-4	Easy	H	..	Old	..	Always.	..	No.
Portlandia	..	White.	4-5	24-36	3-4	Do.	HS	..	Do.	..	Do.	..	No.
Russelia floribunda.	..	Red	3-4	12-24	2-3	Do.	H	..	Do.	..	Do.	..	No.
Russelia juncea (Coral Plant).	..	Do.	3-4	12-24	2-3	Do.	H	..	New	..	Do.	..	2-3
Salvia azurea	..	Pale blue.	2-3	6-12	2	Do.	T	..	Do.	..	Do.	..	1-2.
Salvia uliginosa.	..	Deep blue.	2-3	6-12	1½	Mod.	TD	..	Do.	..	Do.	..	1
Salvia Perennial.	..	Red	1½	6-12	1½	Easy	S	..	Do.	..	Do.	..	1-2.
Snow Bush	..	Varied.	4-5	12-24	2-3	Do.	Su	..	Foliage	..	..	..	No.
Solidago (Golden Rod)	..	Yellow.	1½	6-12	2-3	Do.	Su	..	New	..	Always.	..	1-2.

Method of propagation.—H = Hardwood cuttings; T = Terminal cuttings; S = Seed; SS = Self-sown Seed; D = Division; Su = Suckers.

Cultivation Chart of Perennials—cont.

Name.	Colour.	Height in feet.	Months to reach height	Spread in feet in 2 years.	Cultivation.	Method of propagation.	Flowers on old/new wood.	Flowering period.	Replacement.	Remarks.
<i>Stachytarpetta</i> .	.. Deep blue.	3	6-12	5	Easy ..	H ..	New ..	Always	No.	
Do. ..	.. Pale blue.	3	6-12	3	Do. ..	H ..	Do. ..	Do. ..	No.	
Do. ..	.. Pink ..	4	6-12	4	Do. ..	H ..	Do. ..	Do. ..	No.	
<i>Tabernaemontana</i> .	.. White.	3-4	12-24	3-4	Do. ..	H ..	Old ..	Do. ..	No.	
<i>Tecoma Capensis</i> (Cape Honey-suckle)	Orange.	5	12-24	3-4	Do. ..	H ..	New ..	Do. ..	No.	
<i>Tecoma rosea</i> ..	.. Pink ..	5-6	6-12	4-5	Do. ..	T ..	Do. ..	Do. ..	No.	.. Standard.
<i>Tecoma smithii</i> ..	.. Yellow.	5-6	12-24	4-5	Do. ..	S ..	Do. ..	Do. ..	No.	
<i>Tecoma stans</i> ..	.. Do. ..	6-8	6-12	4-5	Do. ..	S ..	Do. ..	Do. ..	No.	
<i>Tradescantia zebrenia</i>	White.	1	6-12	2	Do. ..	SuT ..	Foliage.	..	1-2.	
<i>Tuberose</i> ..	Do. ..	1-1½	6-12	1	Do. ..	Su ..	New ..	Always.	No.	.. Bulbs.
<i>Turnera</i> ..	.. Do. ..	1-1½	6-12	3-4	Do. ..	T ..	Old ..	Do. ..	No.	
<i>Wandering Jew</i> ..	.. <i>See Tradescantia zebrenia</i> .									
<i>Zephyr Lily</i>	.. Varied.	1	6-12	1	Do. ..	Su ..	New ..	Do. ..	No.	.. Bulbs.

Method of propagation.—H = Hardwood cuttings; T = Terminal cuttings; S = Seed; SS = Self-sown seed; D = Division; Su = Suckers.

ANNUALS

Annuals are plants which only last for a certain season, a year or less, as opposed to perennials which go on from year to year. Certain plants known as biennials, which in temperate climates flower in their second year, are best grown on the plains of South India as annuals.

Uses. Annuals do not make a garden by themselves, but they form its highlights when set in an appropriate framework of green lawns, hedges and perennials.

Garden seasons. There are two distinct garden seasons for annuals in South India. The first season, which is often undeservedly neglected, begins with the showers of late June or early July, when seeds can be sown which will flower from August until the north-east monsoon in October. Some of the seeds for this season can be sown before the hot weather and the plants kept in pots through the hot weather. The variety of flowers which can be grown in this season is great enough to be well worth while. Seed sowing for the second season begins in August or September. The seedlings should be kept in small pots until after the north-east monsoon is over and planted out in the ground at the end of November or early in December. The flowers of this season are at their best from January to March.

Seed sowing. Annuals are generally grown from seed and most seeds germinate best if they are sown in seed pans. A good place for these is under the partial shade of a tree. If there is no suitable tree use the shade of a verandah or a thatched shed, but as the seedlings tend to bend towards the light the pans require turning every few days to make the plants grow straight. If ants are

troublesome paint the bottoms of the seed pans outside with tar, or rest the seed pans on wood ash, or, in very bad cases, rest a plank on two flower pots turned upside down in pans of water, and stand the seed pans on the plank.

Seeds should be kept dry in an airtight tin or a glass bottle with a screw top, and not taken out until they are actually to be sown. It is often better to sow only part of a packet in case conditions are unfavourable for germination and to try the rest later. Do not put in all the seeds close together merely to use up the packet. This crowds the seedlings and renders them more liable to pests. Take care not to get the packet damp, and put it back in the tin or jar as soon as the seeds are sown.

Seed pans.—The smaller size of seed pan with a rim is the most convenient as it can easily be moved out of strong

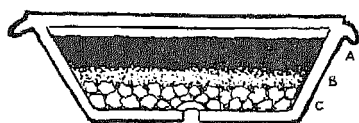


Fig. 7
Seed pan

sun or heavy rain. To prepare a seed pan cover the bottom with small bits of broken brick (C), and put a piece of broken pot over each outlet hole. Cover the stones with

sand (B). Prepare a compost (A) as follows:—

Two parts well sifted soil (preferably old potted soil).

Two parts leaf mould *or* one part manure.

One part sand (for clay soils only).

A teaspoon of superphosphate added to each basket of the compost helps germination and growth. Mix the compost well, water lightly, and keep turning it until it is moist throughout. Fill the seed pans with this compost to the top. Then shake and press down gently with a flat object, until it is about half an inch below the rim and water well. Sow the seed about two hours

later. Take a pointed stick and make a criss-cross pattern of lines about one inch apart in the pan. If the seeds are big enough to pick out individually, sow one seed at each point where the lines cross. If the seed is too fine to pick out individual seeds, mix it with three or four times its bulk of fine sand and sprinkle the mixture along the lines. Cover the seeds with a little more of the dry compost until the lines disappear and water lightly. Care should be taken that watering is done with a fine-rose watering can, or else the seeds are washed away to one side, and some will not germinate due to over-crowding. This will help you to take out the seedlings individually without damaging the roots. Cover the seed pans with newspapers weighted down with stones. This reduces evaporation and helps germination. The newspapers may, in some cases, attract white ants and if so they should be removed. All seeds should be sown in the evening.

Germination and watering. The period of germination varies generally from 36 hours for zinnias to a week for salvias and even more for some other plants. All seeds require watering twice a day, morning and evening, with a seedling watering can. Newspapers should be removed before watering and replaced afterwards until the seeds germinate, when they are no longer necessary. The finer seeds require particularly careful watering so as not to wash them too far down to germinate. Another method for finer seeds is to water from the bottom by resting the seed pan in a larger pan of water for a minute or two until the water soaks upwards.

Transplanting. Seedlings, when large enough, can be transplanted direct into the ground, but this often results in heavy casualties. Seedlings require to be transplanted once and in some cases twice. By this they become stronger. Transplanting into small pots from seed pans

is much more satisfactory, and very greatly reduces ultimate casualties. When the seedlings have two to four true leaves, in addition to the two seedling leaves which appeared first, transplant them into 3-inch pots filled with the same compost as for seed pans, disturbing the roots as little as possible. They can be left in the small pots until they have six or eight true leaves, while being gradually hardened in the meantime to more sunshine. Hardening is done by exposing to the sun in the morning and evening and putting in the shade at mid-day.

Small pots are more difficult to water than seed pans and it is necessary to go over them two or three times at each watering to make sure that the water gets down to the bottom. Water twice a day, morning and evening, with a seedling watering can. Both in seed pans and in small pots seedlings require protection from heavy rain, especially the drips from trees, which will quickly kill them. Protection is best afforded by keeping them on a veranda if the weather is wet, and turning the pans or pots every few days to prevent the plants from leaning towards the light.

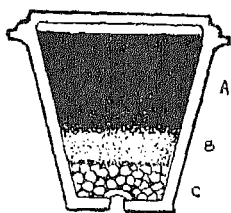


Fig. 8
Flower pot

Planting out. Seedlings should be planted out in the ground when they have six to eight true leaves and in any case before they become too leggy in their pots. In the first gardening season this usually presents no difficulty. In the second season it is desirable to wait until the heavy rain stops before planting out. In a normal year the rains stop by the end of November, and if you have followed the sowing dates suggested in the cultivation chart at pages 70-72, your seedlings will not have suf-

ferred from being kept too long in pots. In abnormal years one must balance the risks of seedlings becoming too leggy or being killed by the rains, the former being the greater danger. A common fault is to plant out annuals too close together so as to use up all the seedlings available. They should be given their natural spread as shown in the cultivation chart on pages 70-72, as they then flower better and are easier to water, mulch and protect from pests. The best time for planting out is in the evening. Dig small holes at the proper distances, then knock out the seedlings along with the soil, by putting two fingers on either side of the seedling, turning the pot upside down and tapping it against another pot. It should then come out with the sand and stones as well. Remove the stones and sand, put the seedling into its hole and push the soil well under it from the sides. If the seedlings have been transplanted into seed pans, take them out with a small trowel. In planting out, leggy seedlings can be sunk slightly, up to the first leaf. Shade the seedlings with leafy branches for a few days to give them a chance to establish themselves and then remove the shade in the evening.

Watering and mulching. After planting out, young plants need daily watering in the evening. This should be done with a watering-can and not direct from a pot, as the heavy splashes wash away the soil and expose the roots besides damaging the plants in many cases. All plants need three things for proper growth, namely, food (manure), drink (water) and air. Mulching gives them air and should be done once a week. It consists of stirring up the entire surface of the bed between the plants with a small fork or pointed stick. When liquid manure is applied the mulching should be done the following morning.

Liquid manure should be given once a week from the time when the first flower buds appear, throughout the

which touches the ground. If you sink small 3-inch pots, prepared as for seedlings, under each node or leaf joint which shows signs of striking root, and weight the joints down with small bricks, they will take root in the small pots. The rooted branch should be cut off between the small pot and the main plant and left for a few days. It can then be taken up in its pot and potted up in a seed pan ready to plant out in June or July. The best time to take layerings is from October to mid-March. Verbenas will flower more freely if the outer branches are lifted gently from time to time so as to prevent them from taking root.

Nasturtiums require good drainage and should be sown direct into the ground as soon as the north-east monsoon is over. The dwarf varieties do better than the climbing ones.

Colour Chart for Annuals.

Plants in italics can be grown in both gardening seasons.

Size.	Pink.	Red.	Orange.	Yellow.	Blue.	Purple.
<i> Dwarf (below 9 inches).</i>	Antirrhinum Rock Hybrid. <i>Chrysanthemum</i> <i>Cascade.</i> <i>Petunia hybrida.</i> Portulaca. Verbena English. Verbena <i>Erinoides.</i>	<i>Petunia</i> <i>hybrida.</i> Portulaca. Verbena English.	<i>Zinnia</i> <i>Linearis.</i>	Hymenanthemum. Portulaca.	Ageratum. <i>Petunia</i> <i>hybrida.</i> <i>Torenia.</i>	<i>Petunia</i> <i>hybrida.</i> Verbena English. <i>Verbena</i> <i>erinoides.</i> <i>Bachelor's</i> <i>Button.</i>
<i> Small (9 to 18 inches).</i>	Aster <i>Balsam.</i> <i>Chrysanthemum</i> <i>Korea.</i> Dianthus hedderwigii. Dianthus Chinensis. Gerbera. <i>Petunia erecta.</i> Phlox. <i>Zinnia Lilliput.</i> <i>Zinnia Cupid.</i>	Aster. <i>Balsam.</i> <i>Cupida.</i> <i>Celosia.</i> Dianthus hedderwigii. Dianthus Chinensis. <i>Gaillardia.</i> <i>Petunia</i> <i>erecta.</i> Phlox. <i>Zinnia Cupid.</i> <i>Zinnia</i> <i>Gracillima.</i>	Calendula. Cosmos <i>Orange Flare.</i> <i>Gaillardia.</i> <i>Gomphrena.</i> Marigold French Harmony. <i>Zinnia</i> <i>Lilliput.</i>	<i>Balsam.</i> Calendula. <i>Calliopsis.</i> <i>Celosia.</i> <i>Gaillardia.</i> Phlox. <i>Zinnia</i> <i>Cupid.</i> <i>Zinnia</i> <i>Lilliput.</i>	Browallia. Cynoglossum. <i>Petunia</i> <i>erecta.</i> Phlox.	<i>Balsam.</i> <i>Petunia</i> <i>erecta.</i> Phlox.

For reasons of space, full names cannot be given in this chart. The cultivation chart on page 70-72 gives fuller names, but it is safer to specify colour as well when ordering. Most seed catalogues give full names.

Colour Chart for Annuals—cont.

Size.	Pink.	Red.	Orange.	Yellow.	Blue.	Purple.
Medium (18 inches to 3 feet).	Antirrhinum. Cornflower Salvia splendens. <i>Zinnia pumila</i> .	Antirrhinum. Calliopsis. Ruby Grass. Salvia splendens. <i>Zinnia pumila</i> .	Marigold. Guinea Gold. (African Dwarf)	Antirrhinum. Marigold French. <i>Zinnia pumila</i> .	Cornflower. Salvia farinacea.	Salvia splendens.
Fairly tall (3 to 4 feet).	Cleome. Cosmos. <i>Zinnia Dahlia</i> Flowered.	Anacanthus. Chrysanthemum. Cosmos. <i>Zinnia Dahlia</i> Flowered.	Cosmos. <i>Zinnia Dahlia</i> Flowered.	Anacanthus. Chrysanthemum. <i>Zinnia Dahlia</i> Flowered	..	Heliotrope. <i>Zinnia Dahlia</i> Flowered.
Tall (4 to 6 feet).	Canna. Hollyhock Indian Spring. Nicotiana.	Canna. Sunflower.	Canna. Marigold African. Tithonia.	Canna. Marigold African. Sunflower.		
Size. (below 9 inches).	Mauve. Alyssum. Chrysanthemum Cascade. <i>Petunia hybrida</i> . <i>Verbena erinoides</i> (variegated).	White. Alyssum. Bachelor's Button. Chrysanthemum Cascade. <i>Petunia hybrida</i> . Portulaca. Torenia. Verbena English. <i>Verbena erinoides</i> .	Mixed. Carnation (pink, white, red). Linaria (pink, white, red). Nasturtium Tom Thumb (orange, red, yellow). <i>Petunia hybrida</i> (pink, red, blue, purple, mauve, white). Portulaca (pink, red, yellow, white).			

Colour Chart for Annuals—cont.

Size.	Mauve.	White.	Mixed.
Small (9 to 18 inches).	Aster. <i>Chrysanthemum Korea.</i> <i>Michælnas Daisy.</i> <i>Petunia erecta.</i>	Aster. <i>Balsam.</i> <i>Chrysanthemum Korea.</i> Dianthus heddlewigii. Dianthus chinensis. Gypsophila. <i>Michælnas Daisy.</i> <i>Petunia erecta.</i> Phlox. <i>Zinnia Cupid.</i> <i>Zinnia Lilliput.</i> Anthrinum. Cloud Grass. Cornflower. <i>Vinca.</i> Chrysanthemum. <i>Cleome.</i> <i>Casmos.</i> <i>Zinnia Dahlia Flowered.</i>	<i>Zinnia Haageana</i> (orange, yellow). <i>Zinnia Lilliput Tom Thumb</i> (pink, red, mauve, white). Aster (mauve, pink, red, white). Dianthus chinensis (pink, red, white). <i>Gaillardia</i> (orange, yellow, red). Gladioli (pink, red, mauve, white). <i>Petunia erecta</i> (pink, purple, mauve, white). Sweet Wivelsfield (pink, red, white).
Medium (18 inches to 3 feet).	<i>Vinca.</i>		Dahlia Single (red, yellow, mauve). Dahlia Double Unwin's Hybrids (Pink, yellow, mauve, white).
Fairly tall (3 to 4 feet).	Chrysanthemum. <i>Cleome.</i> <i>Zinnia Dahlia Flowered.</i>		
Tall (4 to 6 feet).	Nicotiana.	Canna. Ladies Lace. Nicotiana.	Dahlia Double (yellow, pink, red). <i>Hollyhock</i> (pink, red, mauve, white).

The column headed 'Mixed' contains plants which are commonly or exclusively sold in 'mixed' packets. The colours likely to come up are given in brackets.

Cultivation Chart for Annuals.

Name.	Colour.	Height in inches.	Spread in inches.	Sowing dates— Second season.			First season.	Sowing date— First season.	Clay soils.	Loamy and sandy soils.	Weeks to flower.	Flowering period in weeks.	Cultivation.	Remarks.
Ageratum ..	Blue ..	9	6-9 No.	July ..	July ..	26-28	8-10	Diff.						
Alyssum ..	Various ..	6-9	4-6 Do.	.. Sep. 10 ..	.. Sep. 30 ..	15-16	8-10	Mod.						
Amaranthus ..	Various ..	36-48	12-15 June	.. Nov. 1 ..	.. Nov. 8 ..	10	6-8	Easy.						
Antirrhinum Rock														
Hybrid ..	Various ..	6-9	9-12 No.	.. Sep. 1 ..	.. Sep. 15 ..	16-18	10-12	Mod.						See Pests.
Do. ..	Yellow ..	15-18	9-12 Do.	.. Do. ..	.. Do. ..	16-18	5-6	Diff.						Do.
Do. ..	Others ..	15-18	9-12 Do.	.. Do. ..	.. Do. ..	16-18	5-6	V. Diff.						Do.
Aster ..	Various ..	15-18	6-9 Do.	.. Sep. 10 ..	.. Sep. 30 ..	15-18*	6-8	Mod.						* Giants of California 18 weeks.
Bachelor's Button ..	Do. ..	6-9	6-9 June	.. Nov. 15	.. Nov. 22 ..	8-10	6-8	Easy.						
Balsam ..	Do. ..	12-15	9-12 Do.	.. Do. ..	.. Do. ..	8-9	5-6	Easy.						
Browallia ..	Blue ..	12-15	6-9 No.	.. Sep. 15 ..	.. Sep. 30 ..	15-16	5-6	Diff.						
Calendula ..	Various ..	12-15	9-12 Do.	.. Do. ..	.. Do. ..	15-16	6-8	Do.						
Calliopsis ..	Do. ..	15-30	9-12 June	.. Do. ..	.. Do. ..	15-16	10-12	Mod.						
Carnation ..	Do. ..	9	9-12 Do.	.. July ..	.. July ..	20-24	12-15	Diff.						Pots: Marguerite variety quicker.
Celosia ..	Do. ..	15-18	12-15 June	.. Nov. 1 ..	.. Nov. 8 ..	10	6-8	Easy.						
Chrysanthemum ..	Do. ..													
Cascade ..	Do. ..	9	6-9 June	.. Sep. 10 ..	.. Sep. 18 ..	16-18	6-8	Do.						Suckers.
Chrysanthemum ..														
Korea ..	Do. ..	15	12-15 Do.	.. Do. ..	.. Do. ..	16-18	6-8	Do.						Do.
Chrysanthemum tall	Do. ..	36-48	15-18 No.	.. Do. ..	.. Do. ..	16-18	6-8	Mod.						Do.

Plant Name	Color	Height	Flower Time	Seed Time	Seed Size	Seed Weight	Seed Shape	Seed Color	Seed Texture	Seed Use
Glome	Do.	42-48	15-18 June	..	Sep. 15	..	Sep. 30	..	16-18	6-8 Do.
Cloud Grass	White	18	24-30 Do.	..	Do.	..	Do.	..	12-15	10-12 Do.
Cornflower	Various	30-36	9-12 No.	..	Do.	..	Do.	..	12-15	5-6 Do.
Cosmos	Various	18-48	15-18 June	..	Nov. 1	..	Nov. 8	..	8-10	6-8 Easy.
Cuphea	Red	12-15	6-9 June	..	Sep. 15	..	Sep. 30	..	15-16	10-12 Mod.
Cynoglossum	Blue	13-18	12-15 No.	..	Sep. 15	..	Sep. 30	..	14-15	6-8 Diff.
Dahlia Double	Various	48-72	21-24 Do.	..	Aug. 20	..	Sep. 15	..	16-18	6-8 Do.
Dahlia Single	Do.	30-36	15-18 Do.	..	Do.	..	Do.	..	14-15	6-8 Mod.
Dianthus chinensis.	Do.	15-18	6-9 Do.	..	Sep. 10	..	Sep. 18	..	16-18	8-10 Do.
Dianthus hedewigii	Do.	15-18	6-9 Do.	..	Do.	..	Sep. 18	..	12-16	6-8 Diff.
Gaillardia	Do.	13-18	15-18 Feb.-Mar.	..	July	..	July	..	20-24	16 Easy.
Gomphrena	Do.	12-18	9-12 June	..	Nov. 1	..	Nov. 8	..	10-12	12-15 Easy.
Gypsophila	White	15-18	12-15 No.	..	Sep. 15	..	Sep. 25	..	15-16	6-8 Diff.
Heliotrope	Purple	36	12-15 Do.	..	Do.	..	Do.	..	16-18	6-8 Do.
Hollyhock	Various	48-72	24-30 June	..	Do.	..	Do.	..	16-18	5-6 Mod.
Hymenanthemum	Yellow	6-9	4-6 No.	..	Do.	..	Sep. 30	..	12-15	6-8 Do.
Ladies Lace	White	48-60	24 Do.	..	Sep. 8	..	Sep. 15	..	12-15	6-8 Do.
Linaria	Various	6-9	6-9 Do.	..	Sep. 8	..	Do.	..	12-15	8-10 Diff.
Marigold Fr.	Orange	15-18	18-21 June	..	Oct. 20	..	Nov. 1	..	10-12	8-10 Easy.
Harmony	Various	24-36	15-18 Do.	..	Nov. 5	..	Nov. 15	..	8-10	6-8 Do.
Marigold French	Various	48-60	12-15 Do.	..	Do.	..	Do.	..	8-10	6-8 Do.
Marigold African	Orange	18-24	15-18 Do.	..	Do.	..	Do.	..	8-10	6-8 Do.
Marigold African	Do.	6-9	4-6 No.	..	Nov. 20	..	Nov. 30	..	7-8	5-6 Diff.
Nasturtium	Do.	48-60	15-18 Do.	..	Sep. 15	..	Sep. 30	..	12-15	6-8 Mod.
Nicotiana	Do.	12-15	9-12 June	..	Sep. 10	..	Sep. 25	..	10-12	8-10 Do.
Petunia erecta	Do.	6-9	9-12 Do.	..	Do.	..	Do.	..	10-12	8-10 Do.
Petunia hybrida	Do.	12-15	6-9 No.	..	Do.	..	Sep. 15	..	16-18	6-8 Do.
Phlox	Do.	4-6	3-4 Do.	..	Sep. 15	..	Sep. 30	..	10-12	6-8 Do.
Portulaca	Do.	24-36	20-24 June	..	Sep. 10	..	Sep. 25	..	15-16	10-12 Mod.
Ruby Grass	Red	24-36	20-24 June	..	Sep. 10	..	Sep. 25	..	15-16	10-12 Mod.
Salvia farinacea	Blue	24-36	12-15 June	..	June*	..	June*	..	6-8	20-24 Easy.

Cultivation Chart for Annuals—cont.

Name.	Colour.	Height in inches.	Spread in inches.	Sowing dates—		Clay soils.	Loamy and sandy soils.	Weeks to flower.	Flowering period in weeks.	Cultivation.	Remarks.
				First season.	Second season.						
Salvia splendens	Red	24-30	9-12	June	..	Oct. 1	..	Oct. 10	..	12-14	6-8 Do.
Do. ..	Others	24-30	9-12	No.	..	Do.	..	Do.	..	12-14	6-8 Diff.
Sunflower ..	Various	48-72	18-24	June	..	Oct. 25	..	Nov. 5	..	10-12	8-10 Easy.
Sweet Wivelsfield ..	Do.	12-15	6-9	Do.	..	Sep. 10	..	Sep. 18	..	16-18	6-8 Diff.
Tithonia ..	Orange	60-72	24-30	June	..	Nov. 1	..	Nov. 8	..	8-9	6-8 Easy.
Torenia ..	Various	6-9	6-9	Do.	..	Nov. 8	..	Nov. 15	..	8-9	5-6 Do.
Verbena English ..	Do.	6-9	9-12	No.	..	Sep. 1	..	Sep. 8	..	16-18	6-8 V. Diff.
Verbena erinoides	Do.	6-9	15-18	June	..	..	..	..	..	6-8	20-24 Mod. Layings Jan.-Mar.
Vinca ..	Do.	24-30	15-18	Do.	..	Nov. 1	..	Nov. 8	..	8-9	6-8 Easy.
Zinnia Cupid	Do.	15-18	10-12	Do.	..	Nov. 11	..	Nov. 18	..	8-9	5-6 Do.
Zinnia Dahlia	Do.	36-48	15-18	Do.	..	Nov. 18	..	Nov. 25	..	7-8	5-6 Do.
Flowered	Various	12-15	6-9	June	..	Nov. 11	..	Nov. 18	..	8-9	5-6 Mod.
Zinnia gracillima.	Do.	6-9	6-9	Do.	..	Oct. 1	..	Oct. 10	..	10-12	6-8 Easy.
Zinnia haageana	Do.	15-18	6-9	Do.	..	Nov. 11	..	Nov. 18	..	8-9	5-6 Do.
Zinnia Lilliput	Do.	6-9	6-9	Do.	..	Do.	..	Do.	..	8-9	5-6 Do.
Zinnia Lilliput	Do.	6-9	4-6	Do.	..	Oct. 1	..	Oct. 10	..	10-12	8-10 Mod.
Tom Thumb	Orange	6-9	4-6	Do.	..	Nov. 11	..	Nov. 18	..	8-9	5-6 Easy.
Zinnia linearis	Various	24-36	12-15	Do.	..	..	..	..	..	..	..
Zinnia pumila	Do.	6-9	6-9	Do.	..	..	..	..	..	..	..

NOTE.—Sowing dates: In the second season, seeds sown on or shortly after the dates given will be flowering before the end of January.

NOTE.—Sowing dates: In the second season, seeds sown on or shortly after the dates given will be flowering before the end of January.

THE LAWN

An ill-made lawn is a source of constant worry and disappointment. Much trouble has to be taken to form a good lawn. The soil should be drained effectively, if it is observed that water collects in pools and does not drain off after heavy rain. In the hot weather, before the monsoon sets in, dig up the ground to a depth of about a foot and a half, pick out all stones and remove the roots of weeds, etc., particularly those of nut grass. Expose the clods of earth to the scorching rays of the sun to kill weed-roots and to sterilise the soil. A day or two before the rains are expected, break the clods of earth and mix into the surface soil plenty of well decomposed manure, and lightly roll the area. Level the surface by filling in depressions. For levelling, drive in a number of flat-topped pegs at regular intervals; place a straight board on two adjacent plugs, proceeding from one direction, and adjust the level of the board with the help of a spirit level. Let the soil settle down during the first showers. Remove any weeds that may come up. After the ground has thus been prepared, lay out the lawn by adopting one of the following methods. The best grass for lawns in South India is *Cynodon dactylon*, known as the Hariyali (Tamil, arukam pillu). It is low growing, hardy and responds to frequent mowing. In South India a lawn is seldom made by sowing seeds.

Turfing.—Turves (pieces of earth with compact grass on them) should be cut uniformly thick in squares from a place where the grass is short, compact and free from weeds. They should be spread upon the prepared

ground side by side and beaten down flat with a turf-beater. Any cavities in between should be filled with fine soil. Then the entire turfed area should be rolled and watered liberally. This is the most expeditious way of making a lawn. 12 inch bricks, preferably those made of cement concrete, if put in 6 inches into the ground, so that six inches are above the ground level but flush with the level of the grass, will keep the lawn intact and prevent the turf being washed away in rain.

Turf-plastering.—Fresh Hariyali roots should be cut into bits, $1\frac{1}{2}$ to 2 inches long. A mixture consisting of these roots and a solution of fresh cow-dung and water should be made and rendered into a paste by stirring into it the necessary quantity of water. Spread the paste evenly over the prepared ground, previously watered if necessary. Cover the ground then with a layer of coarse sand and manure to minimise evaporation and preserve the roots from the heat of the sun. If there is no rain for the next two days, water liberally. Grass will shoot up in a fortnight. Cut with the scythe to start with, and after three months use the mower.

Dibbling roots.—This is the cheapest and the slowest method. Small roots should be dibbled about six inches apart into the prepared ground when it is wet after rain. The roots spread and grow underground in the course of six months, making a fairly compact lawn, if frequently mown, rolled and watered.

After making a lawn in one of the ways detailed above, rolling, mowing, watering and restoration of patchy places should receive regular attention. Weeds should be pulled out as soon as they appear. Otherwise they soon spread, seed, multiply and overpower the grass. Fill up the gaps occupied by weeds with grass roots and fine soil. In the absence of rain, water the lawn every ten days heavily, soaking the soil through to a depth of at

least nine inches. As freely as the grass grows, mow it and roll it. This makes the lawn velvety and thick. But do not use the roller when the ground is wet and slushy. To have a perfectly green lawn, feed it once a month with liquid manure prepared by dissolving $1\frac{1}{2}$ ozs. of ammonium sulphate in a gallon of water. Rake the soil well with a rake or scarifier once a year before the rains, breaking up the old roots, and top dress the soil with a rich mixture of well decomposed manure and sand. This stimulates vigorous new growth. Constant rolling often results in the formation of a hard crust on the soil which is responsible for bare patches. To break such hard crusts of soil, beat the ground with a hammer provided with spikes set two inches apart.

HEDGES

Most gardens are improved by hedges. They serve to screen off unsightly corners, kitchen premises, ugly walls and wire fences, define and protect the cultivated portion of the compound, act as borders to drives and divide the flower garden from the vegetable garden. Flowering hedges are ornamental in themselves; other hedges enhance, by contrast, the effect of flower-beds and herbaceous borders.

Preparation of soil.—Dig a trench 2 feet wide and 2 feet deep where the hedge is to grow. Leave the soil exposed to the sun for at least a month. A good time to dig the trench is during the hot weather. Replace the soil in layers 6 to 9 inches thick alternating with thin layers of any manure or leaf mould which you can spare and mix the layers well together. Unrotted lumps of manure or leaf mould should be put at the bottom along with kitchen refuse, vegetable peelings, etc. All this will have rotted by the time the roots reach it. For very quick growth use one coolie basket of manure or leaf mould with a handful of wood ash to every 3 yards of trench, and for heavy clay soils add one basket of sand as well for the same length. When the trench is ready water it thoroughly one evening and sow the seed or plant out the next evening. In planting out a hedge of more than one row of plants ‘stagger’ the plants by putting those in the second row between and not immediately behind those in the first row and so on. Hedges require watering at least on alternate days for the first six months after planting and twice a week for the next twelve months.

After that watering is not essential but improves the foliage. Mulch the surface about once a fortnight.

HEDGE PLANTS

Casuarina makes a good hedge 3 to 4 feet high resembling yew at a distance. It does quite well in sandy soil or with brackish water and can be grown quite successfully even without any manure. Seedlings, preferably young, can be purchased. Plant them out between January and March or June and September in three rows, staggered, with 6 inches between each row and between each seedling in a row. Surplus seedlings can be kept to replace casualties, by mixing a paste of fresh cow-dung, earth and water and plastering it round a bundle of fifty to a hundred seedlings. If kept in the shade and watered they will survive for a few weeks. Trim the hedge when about 2 feet high, both top and sides, and allow it to get a little higher at each subsequent trimming. It will reach 4 feet in about a year. If allowed to grow higher than 4 feet, casuarina becomes spindly and leafless near the ground.

Clerodendron inerme has small dark green leaves and makes an excellent neat hedge resembling privet. It can be propagated by terminal or hardwood cuttings (pages 24-25) put down straight into the ground any time from June to March, but preferably between January and March. Put the cuttings down about 2 inches apart and in two or three rows with 6 inches space between the rows. Some of them will fail to sprout and can be replaced by fresh cuttings. *Clerodendron inerme* grows more slowly than the other hedge plants and takes about two years to reach 4 feet. It should be trimmed top and sides as it grows.

Dodonea viscosa has shiny green leaves and, if not trimmed, produces pale yellow flowers. It makes a good

screen or neat hedge, but is not so hardy as *Thevetia*. Sow the seed in the ground in two rows, 1 foot apart with 1 foot between the rows, between November and March. Trim the plants top and sides as they grow. They reach 4 to 5 feet in one year and always need watering in the hot weather.

Henna (*Lawsonia*) makes a screen rather than a neat hedge. Its scented yellow flowers are an added attraction. Sow seed in small pots in June or July and plant out about 2 feet apart in a single row between November and February. Alternatively sow direct in the ground in a single row 1 foot apart in June or July. Trim the plants as little as possible so that they may flower. They reach 4 to 5 feet in one year.

Hibiscus single red grows very easily and makes a most attractive neat hedge with its dark green foliage. Take hardwood cuttings between January and March, plant out in a single row 2 feet apart in June or July. The plants do not need stakes. Keep the top and sides trimmed as the plants grow. They reach a height of 4 feet in a year.

White and yellow lantanas are shrubs with dark green leaves, which flower profusely. The white is sweet scented, more hardy and will tolerate brackish water and sandy soil near the sea. Take hardwood cuttings (page 25) between January and March, plant out the rooted cuttings in June or July and give each leading shoot a strong stake to the height to which you want the hedge to grow. Otherwise the plants will tend to trail. Keep the sides trimmed but allow the leading shoots to reach the required height before trimming. The plants will grow 5 feet high by December.

Madras Thorn (*Pithecolobium dulce* or *Inga dulce*) has small dark green leaves, rather like hawthorn and becomes impenetrable to cattle in 12 to 18 months.

The seed can be sown in small pots between January and March, but is more commonly sown direct into the ground between June and December. Two rows of plants, 1 foot apart, are required, with seedlings 1 foot, or seeds 6 inches apart, staggered in either case. Keep the top and sides lightly trimmed as the plants grow, but do not prune severely at any time or some plants may die and leave unsightly gaps.

Tecoma stans has fairly small leaves and small yellow trumpet shaped flowers and makes a screen rather than a neat hedge. It can be grown from seed or cuttings. Sow between January and March in 3-inch pots, one seed to each pot, sufficient to allow one plant to every 2 feet of hedge and some casualties. Keep in partial shade through the hot weather, transplanting into larger pots as they grow, and plant out in June or July. The plants will grow 6 to 8 feet high in 18 months. Alternatively, sow the seed, after soaking, direct in the ground in June or July where it is to grow, one seed every foot, and thin out, if necessary. The growth from direct planting is slower. Hardwood cuttings (page 25) can be taken between January and March and planted out in June or July.

Thevetia has long, narrow, light green leaves and produces yellow trumpet shaped flowers unless it is trimmed. It makes a neat hedge and is grown from seed. You will need two or, better, three rows of plants, 6 to 9 inches between each row and between the plants in a row. Soak the seeds for 24 hours before sowing. Sow the seed direct in the ground any time except in the very hot weather. Keep the sides trimmed and also cut the top occasionally to make the plants bushy. *Thevetia* takes about nine months to reach a height of 3 feet. The plants sometimes become leafless near the ground after three or four years. If they do so, cut them down in June or July with a sharp knife to a foot from the ground

and tar the large cut ends to prevent rot and borer beetle. They will produce fresh leafy shoots and regain their former height by the following year.

Chinese box (*Murraya Exotica*). This is a rather slow growing bush with small dark shiny leaves bearing white flowers. Orange coloured small round berries collected and dried and sown in small beds will soon germinate. Plant the seedlings in a single row 2 feet apart. Trimming will make the plants bushy.

Prosopis jubiflora is a quick growing cattle-proof hedge which requires frequent pruning. Sow the seeds as in the case of Madras thorn. This has been introduced quite recently and is very popular.

TREES

Trees are mainly used in larger gardens whose beauty they enhance. They can also be used in small gardens, but in both cases one must resist the temptation to have too many trees as they grow rapidly and make it difficult to find room for flowers and vegetables as well.

Trees are of two kinds, foliage and flowering. The existing trees in a garden are usually foliage trees. They are useful in the cultivated portion of the compound to provide shade to sit under and to add interest to the lawns by their shadows. In the wild portion of the compound they form a setting for the garden and keep down the temperature by shading the ground. It is not usually necessary or desirable to cut down existing trees in the wild part of the compound unless they are so crowded together that they cannot grow evenly. In that case cut down the inferior ones and leave the better ones. With a little care and protection they will improve out of all recognition in a year or two. In the cultivated portion of the compound one cannot have flower beds near trees and it may be necessary to remove some of the trees. In that case try to cut the greedy trees such as tamarind, rain, divi-divi trees, etc., and leave those such as neem, polyalthia, etc., which are less harmful. Foliage trees are also useful as windbreaks or high screens. Casuarinas are generally used for the purpose as they grow very quickly. For a formal avenue use the Mast Tree, *Polyalthia longifolia* (variety pendula), which gives much the same effect as cypress.

Flowering trees are best used in the wild part of the compound or as avenue trees. For an avenue it is usual

to plant quick growing trees of the same variety such as Gul Mohurs, or to alternate trees of contrasting colours, such as the Rusty Shield Bearer, *Peltophorum Ferrugineum*, and Gul Mohur, *Poinciana regia*. A single flowering tree can, however, be used as a centre of interest in the cultivated portion of the garden.

A chart of flowering and foliage trees is given on pages 84-86. Select from it the trees you wish to grow and allow them the spread which they will ultimately attain. In the case of the quick growing trees, particularly Gul Mohur and Rusty Shield Bearer, the seedlings should be young and not pot bound or they will not grow well.

Planting.—Saplings should be planted in prepared pits. Dig a pit 4 feet square and 4 feet deep for each sapling and make it up with alternate layers of soil and compost in the same way as a flower-bed (page 16) adding drainage material in clay soils. Kitchen rubbish, unrotted manure and leaf mould or night-soil can be used for the bottom layers, but the top 18 inches should be made up with layers of well powdered soil and well sifted compost. In the evening water the prepared pit thoroughly about 2 hours before planting out the sapling. Make a hole in the pit big enough to take the plant and put the sapling in it. Shade the sapling for a few days if necessary. Take a good stout stake (A) of casuarina about 10 feet long and drive it $3\frac{1}{2}$ feet into the ground beside the seedling (B).

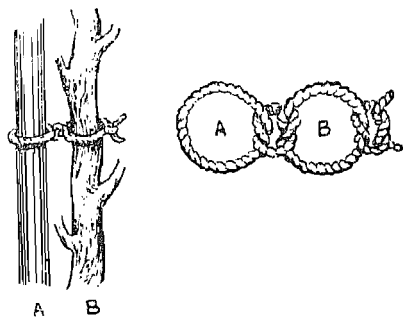


Fig. 9

Tie the seedling to the stake as it grows with coarse string

or plantain fibre or cloth in a figure of eight loop, one loop round the stem and the other round the stake.

To induce quicker growth of the tree earthen-ware pipes $1\frac{1}{2}$ feet long and 4 inches wide are fitted one into the other and inserted in the centre of the pit, sloping to one side, and sticking out to 1 foot above the ground level. The pit is filled with 9 inches of brick jelly at the bottom, sand on top of the jelly to 6 inches, and the rest with manure. Watering should be done round the plant for a month.

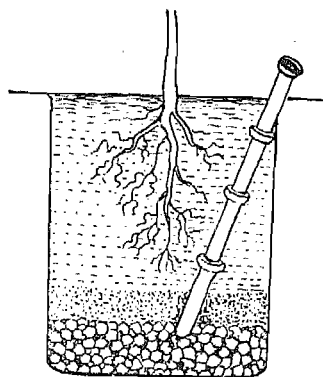


Fig. 10
Preparation of pit for planting
a tree.

After that, pour water in through the pipe. By this system the roots are forced to the bottom and the tree grows faster. When the tree is 3 years old it need not be watered.

Cultivation.—All young trees should be protected with thorns or, better, with a wire netting fence until they get beyond the reach of cattle. They also require regular watering once a day for the first year and on alternate days in the second year. Train the tree to a single stem. If it forks into two leading shoots remove one of them. Trim off all the lower branches gradually, but always leave three or four branches below the leading shoot to help growth. The object is to produce a straight stem without any side branches up to about 8 or 10 feet. Most trees grow upwards naturally and only require support. The Singapore cherry, however, tends to trail and the leading shoot should be made to lean against the stake and be kept in place by putting nails into the stake at intervals on either side of it. The leading shoot

should also be tied lightly to the stake. The lower branches should be trimmed off gradually, always leaving three or four branches below the leading shoot. The stake should, in all cases, be left in place until the tree is strong enough to stand alone against the wind and it is better to err on the side of caution. As an extra precaution the stake itself may be fastened to pegs in the ground with rope or wire.

Subsequent care.—The rich soil in the pit will enable the tree to grow quickly in the first few years and get beyond the reach of cattle. If subsequent growth appears slow, make about 20 small holes 9 inches to 12 inches deep with a crowbar in a circle round the tree at the outermost reach of its branches and put one or two tea-spoonfuls of bone-meal and a little leaf mould into each hole. The end roots will absorb this and it will stimulate growth in a few months.

Species.—There is a large variety of flowering and foliage trees from which to choose. The commoner ones and those of special merit are given in the following chart:—

<i>Foliage Trees</i>				
Botanical Name	Common English name	Height in feet	Spread in feet	Rate of Growth
Adenanthera Pavoniana	Bead Tree	40-50	35-40	Medium
Araucaria Coniferae	Pine Tree	40-50	20-35	Slow
Azadirachta Indica	Persian Lilac	30-40	40-50	Medium
Caesalpinia Coriara	Divi Divi	40	20	Quick
Casuarina Equesetifolia	Casuarina	40	20	Quick
Eucalyptus Citriodora	Blue Gum	35-40	25-30	Medium
Grevillea Robusta	Silver Oak	20-30	15-20	Medium
Melia Azederach	Neem	40-50	25-30	Medium
Muntengia calabura	Singapore Cherry	20-25	25-30	Quick
Pithecolobium saman	Rain Tree	40-50	40-50	Medium
Polyalthia longifolia	Asok Tree	35-40	25-30	Slow
Polyalthia Variety Pendula	Mast Tree	25-30	7-10	Medium
Swietenia Mahogani	Mahogany	40-50	35-40	Slow

Note.—Trees of quick growth reach their ultimate height and spread in 8-10 years, the medium ones in 15-18 years, and the slow ones in 20 years or more.

Flowering Trees.

Botanical Name	Common English Name	Colour of Flower	Height in feet	Spread in feet	Rate of Growth	Years to Flower	Flowering Period
<i>Acacia moliniformis</i>		Yellow	30-40	25-30	Quick	3	Often
<i>Bauhinia monandra</i>	Camel foot tree or Mountain Ebony	Pink	20-25	20-25	Quick	2	Nov.-March
" <i>variegata</i>	"	White	20-25	20-25	Quick	2	Nov.-March
" <i>purpurea</i>	"	Purple	30-35	25-30	Quick	2	Nov.-March
" <i>alba</i>	"	Large White	30-35	20-25	Quick	2	Nov.-March
" <i>candida</i>	"	White scented	15-20	15-20	Quick	2	Nov.-March
" <i>tonnentosa</i>	"	Sulphur yellow	15-20	15-20	Quick	2	Nov.-March
<i>Brownea rosea</i>	"	Rose	10-15	10-15	Slow	10-12	April-May
" <i>coccinea</i>	"	Scarlet	10-15	10-15	Slow	10-12	April-May
<i>Calophyllum inophyllum</i>	The Alexandrian Laurel	White scented	25-30	25-30	Medium	4	May-June
<i>Callistemon lanceolatus</i>	Bottle-brush Tree	Scarlet	15-20	15-20	Medium	3	April-May
<i>Canarium odoratum</i>	Ylang-Ylang— (Japanese)	Greenish yellow, very fragrant	35-40	10-15	Medium	4	Often
<i>Cassia fistula</i>	Indian Laburnum	Yellow	25-30	20-25	Slow	6	June-September
" <i>javanica</i>	"	Whitish pink	25-30	20-25	Slow	6	July-September
" <i>renigera</i>	"	Bright pink	25-30	20-25	Slow	6	June-September
" <i>siamia</i>	"	Yellow	30-35	20-25	Slow	3	July-September
<i>Cithoxylon subseratum</i>	Fiddle Wood Tree	White scented	20-25	10-15	Medium	3	Often
<i>Gordia sebastina</i>	Alowood Tree	Orange	10-15	10-15	Slow	2	Often
<i>Couropita guianensis</i>	Cannon Ball Tree	Red	40-50	15-20	Slow	15	Often

Flowering Trees—cont.

Botanical Name	Common English Name	Colour of Flower	Height in feet	Spread in feet	Rate of Growth	Years to Flower	Flowering Period
<i>Erythrina indica</i>	Coral Tree	Scarlet	30-35	10-15	Quick	2	March-April
<i>Gliricidia maculata</i>	Madre Tree	Whitish pink	15-20	15-20	Quick	2	March-April
<i>Guaicum officinale</i>	Lignum Vitæ	Blue	30-40	30-40	Slow	10	April-May
<i>Lagerstroemia flos reginae</i>	Queen's Flower or Pride of India	Mauve	20-25	15-20	Medium	4	May-June
" <i>rosea</i>	"	Pink	20-25	10-15	Medium	4	May-June
" <i>floribunda</i>	"	White & Mauve	15-20	10-15	Slow	4	May-June
<i>Minusops elengi</i>	" —	Cream	30-40	30-40	Slow	8-9	March
<i>Millingtonia hortensis</i>	Indian Cork Tree	White scented	30-40	15-20	Medium	4-5	October-Nov.; June-July
<i>Peltophorum ferrugineum</i>	Rusty Shield Bearer	Yellow	40-50	40-50	Quick	3	March-June
<i>Poinciana regia</i>	Gulmohur or Flamboyant	Orange-red	30-40	40-45	Quick	4	June-October
<i>Plumeria acutifolia</i>	Temple Tree or Pagoda Tree	White with yellow throat	15-20	15-20	Quick	3	Often
" <i>alba</i>	"	White scented	10-15	10-15	Medium	4	Often
" <i>rubra</i>	"	Reddish White	15-20	15-20	Quick	3	March-April
<i>Saraca indica</i>	Asoka	Red	15-20	15-20	Slow	5	June-October
<i>Spathodia campanulata</i>	Tulip Tree	Orange-Scarlet	40-50	20-25	Medium	5	June-October

CREEPERS

Creepers can be used in a variety of ways. A common use is on a trellis to screen off an unsightly corner or kitchen premises. They look effective when grown on arches or pergolas, or on the wall of a house where they help to link the building with the garden and soften its harsh lines. They can also be grown over dead or unshapely trees which they then turn into objects of beauty.

Trellises.—For a permanent trellis the ideal is to make the uprights of iron piping and the framework of wire netting or stout wire in a pattern of squares. Creepers have a tendency to grow straight up but should be trained horizontally, starting from the bottom of the trellis. Otherwise it is impossible to cover the lower portions later.

Arches should only be made if they definitely lead somewhere, e.g., through a gate or from one part of the garden to another. Here again the ideal is to use durable material.

A Pergola makes an enclosed walk and consists of a series of rectangular arches covered with creepers and joined together along the top. Strips of wire netting can be laid along the top and side poles and the creepers allowed to spread a little on them. The pergola will look more effective if the creepers do not entirely cover the top. Here again the ideal is to use durable material, such as stone, brick or concrete pillars or iron posts. Each post or pillar requires its own creeper.

Wall creepers.—Creepers look very attractive when grown on the wall of a house, provided they are given good support and can grow neatly. The most satisfactory type of support is provided by putting rawlplugs, screws or nails into the wall in a neat symmetrical pattern

and securely fastening stout wires horizontally and vertically between them. This wire forms the foundation for a framework of thinner wire running straight upwards (not criss-cross) to which the leading shoots can cling or be tied.

Propagation.—Annual creepers are grown from seed and will generally seed themselves, or the seed can be collected from the plants for the following season. Methods of propagation for perennial creepers are given in the cultivation chart on page 89, but unless large quantities are required it is simpler to buy them.

Cultivation.—For creepers on a trellis, dig a trench 2 feet wide and 2 or 3 feet deep in front of the framework, and make it up in the same way as a flower-bed. For individual creepers on arches, walls, pergolas or trees, dig pits 2 feet square and 2 or 3 feet deep, one for each creeper, and make them up again in the same way as flower-beds (page 16).

Pruning.—Annual creepers require no pruning. For perennials constant light pruning for shape is necessary as well as an annual pruning to secure flower. Those which flower on new wood should be cut down to within 6 inches or 1 foot from the ground every year in June after the first showers. The cut ends should be tarred to prevent rot. Creepers which flower on old wood should be pruned for shape at the same time and, if possible, some of the oldest and least vigorous growth removed.

Replacement.—Some perennial creepers grow leggy after a time and fail to flower. They should then be replaced. Approximate replacement periods are suggested in the chart on page 89.

Varieties.—There are many creepers which can be grown in South India, but the commoner ones are given in the chart on page 89. To these must be added the varieties of bougainvilleas which can be grown as climbers (pages 35-43).

Cultivation Chart for Creepers.

Name.	Colour.	Growth.	Uses.	Flowering season.	Flowers on old/new wood.	Replacement period.	Method of propagation.	Remarks.
<i>Annual Creepers.</i>								
Morning Glory (Ipomoea)	Blue, red, etc.	Very quick.	All	Always	..	6 months.	Seed.	Flowers in 2 months.
<i>Perennial Creepers.</i>								
Antigonon	Pink	Quick	SAT	Always	New.	No	Tubers and seed, T.	Soak seed. Do.
Do.	White	Medium	Do.	Do.	Do.	No	Do.	
Bignonia	Orange	Slow	SATW	Jan.-Mar.	Old.	No	H.	
Do.	Yellow	Do.	Do.	Always	Do.	No	H.	
Congea Tomentosa.	Pink mauve.	Do.	All	Nov.-Mar.	Do.	No	H.	
Honeysuckle	White	Medium	WST	Mar.-July.	Do.	No	H.	Must face morning sun.
Ipomoea Learii	Purple	Quick	SAT	Always	New.	1 year.	Seed, T.	
Jacquemontia	Blue	Do.	All	Do.	Do.	No	Do.	
Jasmine	White	Medium	SATW	Do.	Do.	No	H.	
Passion Flower	Purple	Do.	SAT	July-Oct.	Do.	No	H.	
Perennial Morning Glory—See Ipomoea Learii.								
Petrea	Purple	Slow	PTW	Always	Old.	No	H.	
Quisqualis (Rangoon Creeper)	Red	Medium	SAT	Do.	New.	No	Su.	
Thunbergia	Blue	Do.	SA	Do.	Do.	No	H.	
Do.	White	Do.	Do.	Do.	Do.	No	H.	

Notes.—(1) In the column headed 'Uses', S = screen or trellis climber; A = arch climber; T = tree climber; W = wall climber; P = pergola climber.

(2) In the column headed 'Method of propagation', T = terminal cuttings; H = hardwood cuttings; Su = suckers.

SPECIAL FEATURES

In some gardens special features such as rock, wall, sunken or water gardens can be used with advantage. They should not as a rule be included in the design merely because the idea of such special features is in itself attractive, but can well be used if the natural features of the garden lend themselves to their inclusion.

A *rock garden* can be used to conceal some awkward corner, such as a disused well, or a place beneath a greedy tree where nothing will grow, or to form a centre of interest, say, at the far end of the garden. If the rock garden is anywhere near trees, make a foundation of broken bricks, stones and building rubbish at ground level to keep the tree roots out of it. If this is done flowers can be grown in a rock garden even under a tamarind tree. Then build up the rock garden with plenty of stones in some irregular shape indicated by the situation, so as to simulate a range of hills with one or more valleys between. Each stone should be at least three-quarters buried in the soil so as to prevent the soil washing away in the rain. Pieces of laterite, or other rock can be used. Artificial 'rocks' can be made by digging holes in the ground, putting concrete into them and leaving it to set. For soil, make a compost in the same way as for seed sowing (page 60), fill all the spaces between the stones with it and ram it well in so that it will not sink later leaving the roots of the plants exposed. Each plant should have a good pocket of soil in which to grow.

A rockery should never be symmetrical. It should be as natural as possible. There are two types of rockeries.

One is with succulents and the other is with creeping and dwarf flowering plants. Some people mix both.

Effective use can be made of trailing plants such as verbenas, petunias, commelinas, coleus, Wandering Jew, etc. If the rock garden is in the open or gets the morning sun, any of the small perennials on pages 51-53 and

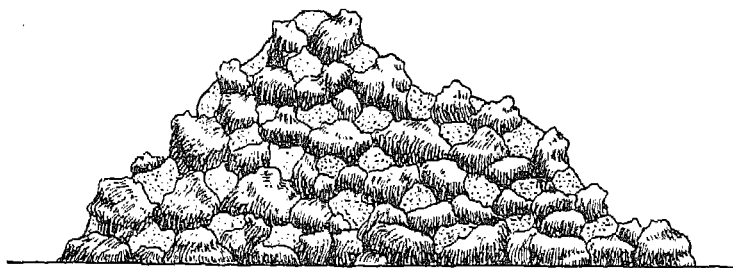


FIG. 11
Rockery

of the dwarf and small annuals on pages 70-72 may be used in it. Even if it gets little or no sun, commelina will still flower freely, and coleus, Wandering Jew, and lygodium fern will do well in it.

A rock garden under a tree, if no proper foundation is made, should be remade every year as the roots will get into it and rob the plants of food.

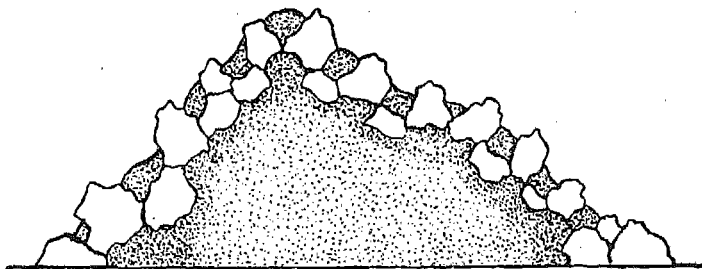


FIG. 12

In places where snakes are common it is better to put cement plastering in between the rocks, making shallow pockets for plants. This does not leave any holes for snakes to go into. Any crevice or hole should be filled immediately it is noticed.

To make a rockery, old building debris and soil should be heaped up in the required shape. This should be watered and pressed well. Rocks should be arranged on the surface leaving pockets for plants. A pipe line may be fixed in the centre on the topmost point of the rock, with a channel surfaced with cement for water to run down, making waterfalls; miniature buildings, pools, pathways and small bridges also look very attractive.

Wall garden.—A variant of the usual rock garden is a wall garden used to strengthen or replace a sloping bank. It consists of three or more low terraces made of brick or stone, each about six or nine inches high, one above the other, filled with any of the plants which can be grown in a rock garden.

A *sunken garden* is an effective means of using a depression in the ground or of concentrating attention inside the compound by attracting the eye downwards. In a small garden it enhances the apparent size of the grounds, since even a few flowers in a sunken garden give the illusion of a much larger mass. A sunken garden may be of any size, but should contain an open space in the centre, of grass or paving, stone, or brick. There should be some point of interest in the middle of it, such as a sun-dial, bird bath, water garden or bed of flowers. The beds should be built up in tiers of brick or cement round the outer sides of the garden and steps made to lead down into it. If the garden is a large one there may be grass or paved paths between the beds. A pleasing effect can be secured by making some, but not all, of the planting symmetrical, e.g., planting all the corners with the same

thing, having clumps of the same species on either side of the steps leading into the garden, and repeating the same varieties one above the other in the terraces. In a small sunken garden it is better to use only the same plants as in a rock garden. In a large one rather taller plants can also be included.

Water gardens.—A natural water garden of water lilies can be made in a pond in the compound, but most water gardens are artificial. A water garden may be used as a centre of interest, particularly when backed by a rock garden. A water cistern can often be turned into a water garden, for water lilies will survive a fair amount of fluctuation in water level. If the water garden is specially made, the best depth is five feet, so as to allow $2\frac{1}{2}$ feet of compost and $2\frac{1}{2}$ feet of water above the cement bottom, but lilies will thrive at greater or lesser depths and with a considerably shallower soil. The shape of the pond is a matter of taste. Circles and rectangles are easiest to make. A pond about two feet wide by six or eight feet long, with the long sides bulging slightly outwards, is very effective. Whatever the shape the rim of the pond should be practically flush with the ground, so that the flowers can be seen at a distance. The cement may be hidden by creeping plants. Water lilies flower best in full sun, but will also bloom in partial shade.

In making up a new lily pond, prepare a compost of equal parts of manure, leaf mould and sand, and half fill the pond with it. Then put in the water and allow it to settle for a few days. If you are using an existing pond, merely dig a hole in the soil at the bottom where you mean to put the water lily and put one or two baskets of the compost into it.

Propagation of water lilies is generally by division, but for the beginner it is easiest to buy the plants, which are sold either in small baskets or in pots. If in a basket,

plant the lily with its basket, which will rot and allow the roots to get into the soil. If in a pot, break the pot, but keep the pieces in place and plant in the hole prepared for it.

There are several varieties of water lilies in white, pink, mauve, blue and purple shades. The white is the most hardy and will stand moderately brackish water. It spreads rapidly, and to maintain large flowers it is necessary to pull up the outer parts of the plant every few months.

If the water from the lily pond is not constantly changed it may breed mosquitoes. The Health Department will usually supply larvicidal fish free on request. The fish do no harm to the plants and eat any mosquito larvæ.

VEGETABLES

The following fair variety of vegetables can be grown with a little care on the plains of South India. There are other varieties which can also be grown, given favourable conditions and skilled attention, but the beginner is advised to start with the easier ones. They are *artichoke* (*Jerusalem*), *basil*, *beans*, *beetroot*, *cape gooseberry*, *capsicum* (*sweet pepper*), *carrot*, *chillies*, *cress*, *cucumber*, *egg plant* (*brinjal*), *ladies fingers* (*okra*), *lettuce*, *marrow*, *mint*, *parsley*, *radish*, *roselle*, *snake gourd*, *spinach*, *sweetcorn* (*Indian corn*), *Swiss chard* and *tomato*.

Site.—Vegetables need a similar situation to flowers, but are best grown in a separate part of the garden. A plot about 50 feet by 25 feet is a convenient size for a family of four or five.

Preparation.—The soil should be prepared in the same way as for flower beds (page 16). The composts recommended for flower beds will produce a moderately rich soil. Some vegetables require rich soil, and for them add an extra basket of manure per square yard of bed surface at the time of sowing seed or planting out.

Rotation.—It is quite possible to grow two or more lots of vegetables in the same bed in succession, but they do better if vegetables which produce fruit in their roots, such as artichokes, beetroots, carrots and radishes, are alternated with those which produce their fruit above ground, such as tomatoes. If a vegetable requiring moderately rich soil is grown after one requiring rich soil, it is not essential to add any further manure, though

a little, say a quarter basket per square yard, can be added with advantage.

CULTIVATION OF VEGETABLES

Jerusalem Artichokes can be sown from July to December. They require moderately rich soil. A soil which was liberally manured for a previous crop is just right without a fresh addition of manure. The plants grow from the eyes in the rind of the tubers. Save the peel from any tubers you buy, and cut it into pieces each containing one or more eyes. Plant straight into the ground about three inches deep and 6 to 12 inches apart in rows, 12 inches between rows. Water freely. New tubers mature in about four months. To test maturity, remove a little soil or lift the tubers when the leaves wither.

Basil (sweet large green) is a herb, used like thyme and other herbs. It requires moderately rich soil. Sow September-November in seed pans. Plant out 6 inches apart. When the plants reach a height of 15 to 18 inches, pick a few leaves at a time, dry and rub through a fine sieve. They should be ready to pick in eight weeks.

Beans (Dwarf French)—Variety Golden Wax, Stringless, Stringed, etc. Best sown from November until February. They can be sown in October but are liable to die if the monsoon is heavy. They require rich soil. Prepare raised ridges of soil about 4 inches high, 15 inches apart. Make a shallow depression about $1\frac{1}{2}$ inches deep along each ridge with a stick. Germination is helped by soaking the seed in water for 24 hours before sowing. Sow seeds in the depression 6 to 12 inches apart and push soil over them from both sides. Put a stake two feet high at each end of the row and run two pieces of coir along the row between the plants, back and front, to support them against the wind. Alternatively give each plant a separate stake about two feet high and tie the plant to it

when 8 inches high with soft plantain fibre in a figure of eight loop (Fig. 9 page 82). Beans are ready in six weeks. Pick daily and eat when young. They are ready to pick when they snap clean leaving no strings.

Beans (Lima) are climbers requiring rich soil. Plant any time from July to October 5 to 6 seeds, 2 feet apart, near a wall with a south aspect or in an open space facing south. When the plants are about a foot high destroy all except the two strongest. Train these on a trellis prepared as for cucumber. (Page 99.) Alternatively grow on a wire fence or pandal. They will be ready in ten weeks, and continue to yield until April. Keep picking the pods before the shells harden.

Beans (Goa) are also climbing beans. Cultivation the same as for the Lima. Pick beans when only half formed, and cook whole.

Beetroots require rich soil. Sow August to November. Soak the seeds for 6 to 8 hours before sowing, and sow in ground 1 inch deep in rows, thinly, 15 inches between rows. When plants come up, sprinkle wood ash round them and thin out to 4 to 5 inches apart by pulling up superfluous plants. Thinnings can be transplanted elsewhere if carefully pulled up. Ready in 10 to 15 weeks. If germination is poor as sometimes happens, plant lettuce in the gaps. They will be over before the beetroots are ready. Quantity required $\frac{1}{4}$ oz. for 50 feet of row.

Cape gooseberry is a fruit. Requires moderately rich soil. Can be sown from September to November. Sow in a seed pan, and plant out in rows 18 inches apart with 24 inches between rows. Ready in three months. Quantity required—small packet. Grow fresh plants every year.

Capsicum (sweet pepper) requires rich soil. Can be sown from July to November. Sow in seed a pan and plant out in rows 18 inches apart with 18 to 24 inches between the rows. Mulch each week and

add two handfuls of manure to each plant every three weeks. Cut off 2 inches from the top when plants are 6 inches high to secure bushy growth and prevent premature fruiting. Cut off the fruit when ready. Do not pull it off as this damages the roots. Ready in 3 to 4 months. Quantity required—small packet.

Carrot.—Varieties acclimatized, and intermediate stump rooted. Requires moderately rich soil. Can be sown September-November. Prepare ridges as for beans about 4 inches high, 12 inches apart. Sow seed in the ground on ridges, seed by seed, 1 inch deep and 2 to 3 inches apart. When plants have 4 to 5 leaves they can be thinned out to 4 inches apart. Alternatively, unless the plants are very close together, leave them until small carrots form, and then do the thinning. The thinnings can then be eaten and are very tender. Ready in three months. Quantity required— $\frac{1}{4}$ oz. for a row of 50 ft.

Chillies.—Country variety. Require moderately rich soil. Can be sown June-February. Sow in a seed pan and plant out in rows 18 inches apart with 24 inches between rows. Ready in 3-4 months. Quantity required—small packet.

Cress.—Variety curled. Can be planted July-December. Take a bundle of cress from the market. It has little white roots where the branches have touched the soil. Cut off pieces 3-4 inches long containing these roots and put in a seed pan of sand just covering the roots. They take root and sprout in a few days. Then transplant 2 inches apart into seed pans of moderately rich soil. Keep the pans in the shade. Tree shade will do except during wet weather, when they should be kept on the verandah, as drips from trees kill the plants. Ready to cut in 6-8 weeks. Cut sparingly at first. Can be kept through the hot weather with care. Take fresh cuttings as required.

Cucumber.—Varieties Early cluster, longfellow, kakri. Can be sown July-December. Requires rich soil. Can be allowed to trail on the ground outside the vegetable plot but are better grown up a trellis against a wall, or on a wire fence round the vegetable plot. They trail about 6-8 feet. Make a trellis of bamboo or casuarina poles 8 feet high driven 2 feet into ground and 4 to 5 feet apart. Tie or nail other posts across horizontally at the top and half way up. Tie rough coir to the posts in horizontal and vertical lines to make a netting, leaving 6 inch squares between strands. Plants should be tied to the trellis netting as they grow with soft plantain fibre in figure of eight loops (Fig. 9 page 82). Sow seeds in the ground 1 foot apart, and thin out to 2 feet apart when the plants have strong shoots, by pulling up superfluous plants. When fruit is forming, water with liquid manure once a week. Support the fruit with a sling of plantain fibre tied to a horizontal trellis pole, to take weight off the stem. Ready in 6-8 weeks. Quantity required—small packet.

Egg plant (brinjal).—Varieties Nanjangud, Gool, Large Round, Muktakesi, Green Long, Favourite, Rainy Season, Purple. Requires rich soil. Can be sown September-October. Sow seed in seed pans. When seedlings are 2-3 inches high transplant into 3 inches pots, 1 per pot. When they are 5 to 6 inches high, plant out in shallow trenches 1 or 2 inches deep, 2 feet apart and 2 feet between rows. Alternatively plant out direct from seed pan when 4 to 5 inches high. Fill in trenches when plants are 18 inches high. Subsequent culture same as for tomatoes (page 103). Ready in 3½ to 4 months. Quantity required—small packet. Very liable to insect pests, mainly stemborer and red spider, which can be controlled by tobacco and fish oil treatment (page 106).

Ladies fingers (Okra).—Varieties Velvet Pod, Long American. Requires moderately rich soil. Can be

sown June-August. Sow seed in the ground 1 inch deep, 12 inches apart, and 2 feet between rows. Ready in 15 weeks. Quantity required—small packet. Very liable to insect pests. Control as for brinjals.

Lettuce.—Varieties New Imperial, All the Year Round, Cabbage. Requires moderately rich soil. Can be sown July-November. Ants like to remove the seed. To prevent this, sow in seed pans and lay the pans on a bed of wood ash. Prepare raised ridges 3-4 inches high as for beans, about 1 foot apart. When the plants have 4 leaves about $\frac{1}{2}$ inch long transplant into these ridges, about 6 inches apart. Alternatively sow direct into the ground $\frac{1}{2}$ inch deep in ridges, 2 inches apart and surround each ridge with wood ash to make a barrier against ants. Ready in 6-8 weeks. Quantity required— $\frac{1}{4}$ oz. for a row of 50 ft.

Marrow (vegetable).—Country variety. Requires rich soil. Can be sown July-December. Should be allowed to trail on the ground outside the vegetable plot to let the stems take root and help to sustain the plant. Plants trail 15-20 feet. Sow in the ground 6 inches apart, and when the plants grow a few inches, thin out to 18-24 inches apart. Alternatively, if more convenient, sow in small mounds 10 feet apart, 5 or 6 seeds to a mound. Leave only two plants to grow in a mound. Cut off the end of the main stem when 8 feet long to induce branching. Water freely. Ready in 6-8 weeks. Quantity required—small packet.

Mint requires moderately rich soil. Can be planted June-December. After cutting off the leaves of a bunch of mint from the market put the stalks slanting into soil in a seed pan, about 2 inches apart. They take root in 2 to 3 weeks, and are ready for cutting in 8 to 10 weeks. Cut sparingly at first. Best grown in seed pans in partial shade. One or two seed pans will be sufficient. Can be

kept through the hot weather with care. It is best to start fresh plants each year.

Parsley requires moderately rich soil. Can be sown June-December. Soak seeds in warm water for 6 to 8 hours before sowing, to help germination. Sow in seed pans and when plants have 2 to 4 true leaves, transplant into other seed pans about 2 inches apart, and keep in partial shade, or plant out in the ground 3 inches apart. Ready for cutting in $2\frac{1}{2}$ to 3 months. Cut sparingly at first. Three seed pans will be sufficient. Keep the pans well watered. Can be kept into the hot weather with care. Start fresh plants each year. Quantity required—small packet.

Radish.—Varieties French Breakfast, Scarlet Globe, White Icicle. Requires moderately rich soil. Can be sown August-January. Sow at intervals of one month in the ground thinly, 1 inch deep in rows, 9 inches between rows. Thin out to leave 3 inches between the plants. To make good radishes form, stir the soil frequently and push the soil up round the crowns of plants so as to cover roots completely. Ready in 4 to 6 weeks. Best eaten young. Quantity required— $\frac{1}{4}$ oz., for 50 feet of row.

Roselle is a fruit which can be cooked whole after removing the seed. Requires moderately rich soil. Sow seed in the ground any time except during heavy rains, about 1 foot apart in rows 2 feet apart. Thin out to $1\frac{1}{2}$ feet apart. Ready in 4 months. Quantity required—small packet. Grow fresh plants every year. The leaves are cooked like greens.

Snake gourd.—Country variety. Requires rich soil. Can be sown July-December. Plants should be trained on pandals. Take four bamboo or casuarina poles about 6-8 feet long and drive 18 inches to 2 feet into the ground to make 3 feet square. Make a lattice of split bamboo on top of these poles. Make a small hole under each pandal and sow three seeds in it. Alternatively, make

a long single pandal 3 feet wide, and sow the seeds in groups of three at 3 feet intervals under it. When plants grow, remove all except the strongest plant in each group. Put a stake for this to climb up to the pandal, and tie the plant to it with soft plantain fibre in a figure of eight loop (Fig. 9 page 82). When fruit is 15-18 inches long tie a stone to each fruit with string or rope, to keep fruit straight. Otherwise it curls and cracks. Ready in 2-3 months. Quantity required—small packet.

Spinach.—Requires moderately rich soil. Can be planted July-December. After cutting off the leaves of a bundle of spinach from the market, put the stalks slanting into the ground about 6 inches apart in rows, 1 foot between rows. Can also be planted between rows of tomatoes. Shade until they take root and sprout. Ready to cut in three months. Use only tender leaves. Cut sparingly at first.

Sweet corn (Indian corn).—Varieties Golden Bantam, Country Gentleman, Makkacholam (acclimatized). Requires moderately rich soil. Can be sown July-November. Prepare raised ridges 5-6 inches high and 1 foot apart to form a block at least 1 yard square. It is necessary to plant in a block and not in a single line to enable plants to fertilize each other and set fruit. Otherwise hand pollination will be needed. Sow seed on the ridges in groups of three about 6 inches apart. Mulch each week and keep the plants well earthed up. Do not water the plants direct, but run water between the ridges. Ready in 8-12 weeks. Quantity required 2-3 packets.

Swiss chard (sometimes advertised under beetroot in seed catalogues).—Requires moderately rich soil. Can be sown July-November. Sowing and cultivation as for lettuce which please see. Ready in 30-45 days. Cut outer leaves only leaf by leaf, and prepare like spinach or greens. Quantity required 1 packet.

Tomato.—Requires rich soil. Can be sown August-December. Plantings earlier than August are very liable to leaf curl. Between August and October sow varieties Marglobe, Ponderosa, Ox Heart and Market King. In November and December sow further seed. At intervals of ten days sow about a dozen seeds in a seed pan or in 3-inch pots, 1 seed per pot. When the plants are 4 inches to 6 inches high, plant out in the ground 15 inches apart with 2 feet between rows. When the plants are 1 foot high support each plant with a thin bamboo stick about 8 feet long driven 2 feet into the ground. Tie the main stem of the plants to sticks as they grow with soft plantain fibre in a figure of eight loop (Fig. 9 page 82). Plants will produce side shoots at junctions of leaf and main stem. Nip off all these side shoots with thumb and finger before they are 2 inches long. If they are longer than 2 inches cut off with a sharp knife or scissors. This throws strength into the main stem and fruit, lets the plants get sun and air, hastens ripening of the fruit, and makes pests easier to find. If the main stem splits into two heads, cut off the weaker one with a sharp knife. If the soil is very rich, allow two main shoots but no side shoots. Plants produce flower shoots on the opposite side of stem from the leaves. When four flower shoots have appeared, cut off the head of the plant with a sharp knife. Plants set fruit better, especially in wet weather if pollination is assisted by shaking the plants gently or by dusting all flowers lightly with a rabbit's tail or soft brush. If fruit is very heavy, tie bamboo sticks horizontally between upright sticks, and support flower shoots by tying to horizontal sticks with soft plantain fibre. When fruit begins to form, cut off half of each leaf below the lowest flower shoot. This throws strength into the fruit. Apply liquid manure once a week. Fruit in 3-4 months from sowing seed. If the fruit is attacked by

birds, pick when a golden colour and ripen indoors or in the sun. Quantity required—One packet of each variety to be grown.

Tomatoes grown before the north-eastern monsoon are liable to leaf curl. This is a disease for which there is no cure. Leaves curl up and the plants seem to be withering. If it occurs pull up the affected plants and burn them to prevent them from infecting others. Leaf curl can be avoided to a large extent by keeping all the beds clean and free from decaying leaves, and by watering plants freely, twice a day if weather is hot and dry. To make sure that water reaches the roots, knock out the bottoms of old small seedling pots, sink one in the ground by each plant, and pour water into it.

Tomatoes are also liable to attack by caterpillars, which can be detected by their droppings like little black dots on the leaves. They attack the fruit. Pick off caterpillars by hand and drop into a tin of very hot water or kerosene oil. They are often under the leaves.

PESTS

Of all the difficulties which beset the gardener, those caused by the ravages of pests are the most irritating. The trouble can be greatly reduced by general preventive measures. These are, scrupulous cleanliness and tidiness throughout the garden, including the uncultivated portion of the compound, the removal and adequate disposal of all rubbish, undergrowth and decaying matter, and a periodic spraying of all plants with insecticide. A simple insecticide is made by dissolving 2 ounces of arsenate of lead in 8 gallons of water, apply it with a syringe or a stirrup pump with the nozzle at 'spray' or a seedling watering can with a fine rose. It should be sprayed all over the leaves in the evening during a dry spell. It is a powerful stomach poison to biting insects, adheres well to the leaves and is harmless to young and tender foliage. It should not be used for vegetables as it is poisonous. Use fish oil soap and tobacco instead, as for plant lice. (Page 106.)

Biting insects include grasshoppers, caterpillars, beetles, and the larval stage of certain moths. They can be detected by the holes made in the leaves and are best controlled by the application of lead arsenate solution, and by hand picking. Many biting insects, particularly the small brown beetle which attacks zinnias, are difficult to find by day, as they seem to go underground, but can easily be caught on the plants after dark by the light of a torch. Drop them into a tin of kerosene oil. They are often under the leaves. There is one interesting way of catching these nocturnal beetles. A lighted kerosene lamp placed on a brick in a basin of water will attract

these insects, and they drown themselves in the water in the basin.

Antirrhinum pest.—Antirrhinums are often attacked by small greyish-green caterpillars which cause the tips of the shoots to curl up. They can be destroyed by a solution of one part of lime sulphur dissolved in sixty parts of water, applied with a flit pump as a fine spray to the foliage. Take care not to let the solution drop on to the ground.

Plant lice attack annuals, particularly zinnias, and are usually found on the under surfaces of the leaves. Apply a solution of fish oil soap and tobacco with a seedling watering can. The solution is made by boiling one tablespoon of fish oil soap and 1 lb. of country tobacco stalks in 1 gallon of water for a few minutes, allowing it to cool, straining off the liquid and using as required, diluted with eight times the volume of plain water.

Fungi usually produce a sort of white fluff on leaves or stems. They are controlled by sponging with a strong alkaline solution made with 2 ounces of soft soap and 2 fluid ounces of ammonia dissolved in 8 ounces of water. Another excellent fungicide is Bordeaux mixture, made by dissolving 1 lb. of copper sulphate and $1\frac{1}{2}$ lb. of unslaked lime in 10 gallons of water. This is applied by spraying but has the disadvantage of leaving blue spots on the foliage for some time.

Leaf curl fungus makes the leaves curl up. It particularly attacks tomatoes grown before the north-east monsoon and plants which are inadequately watered. Fungicide may be applied but there is little hope of complete recovery, and it is usually best to pull up the plants and burn them before they infect others. This ruthless treatment generally pays in the long run.

Root feeding larvae cause plants to wither and droop or in some cases merely to dwindle in size. They can be

avoided to a great extent by careful attention to the quality of the manure. Fresh or half decayed cow manure, or half decayed leaf mould harbours large numbers of larvæ. All manure or leaf mould should be sifted before use. The best way of dealing with larvæ in the ground is to remove the soil round the roots of the affected plant with a small fork. The larvæ are found at a depth of half an inch to two inches and should be picked out and destroyed. Slugs should be dealt with in the same way. An extra precaution, after removing all visible larvæ, is to water the soil round the roots with a pale pink solution of potassium permanganate which kills any remaining larvæ in the soil but is harmless to the roots of the plants.

Scale attacks mature wood, particularly hibiscus, and takes the form of small incrustations on the branches, exuding a sticky substance which attracts black ants in large numbers. When only one branch of a plant is affected it should be cut off and burnt. When several branches are attacked treat by sponging the bark with a strong alkaline solution as for fungi.

White ants (termites) are easily recognized by the deposits of fine earth which they leave on the stems of plants. They are very destructive and are encouraged in the garden by the presence of decaying matter or garden rubbish which constitutes their staple diet. The pest is greatly reduced by the general preventive measures described above, but if it occurs it should be treated by dusting the ants and their runs with 'White Ant Exterminator.' Wash the hands afterwards as the preparation is poisonous.

Worms can be detected in lawns by their worm-casts or small mounds of earth. They can be eradicated by watering the ground with a solution of 1 oz. of mercuric chloride in 30 gallons of water for every 300 square yards,

and then watering again with 50 gallons of plain water. This remedy is best applied when the grass is wet.

Grass pest.—In November 1937 the grass in some Madras gardens disappeared overnight. Attention was attracted to the lawn by the unusual number of birds feeding there. Examination showed that the blades of grass above ground level had been completely bitten off by the larval stage of a moth, which could be seen in thousands adhering to the grass stumps. The lawns were sprayed with a tobacco concoction prepared by boiling 1 lb. of country tobacco and $\frac{1}{4}$ lb. of soft soap in 1 gallon of water. This was diluted with six times its volume of plain water and applied with a watering can. It was effective and the grass recovered in ten days.

The market offers a wide range of insecticides and fungicides ready prepared. They are cheap and effective and are sold with directions for use.

GARDENING CALENDAR MONTH BY MONTH.

Month.	Digging and planning.	Fertilizers.	Propagation.	Cultivation.	Vegetables.
April	Plan new features. Dig new beds.	Make leaf mould. Buy lime.	Prune Poinsettias and keep in shade. Dig up Cannas. Leave Cleome to seed itself. Divide Angelonia.	....	Prepare beds. Sow Roselle.
May	Plan new features. Dig holes for creepers.	Make leaf mould.	....	Refill the beds with manure and soil.	Do.
June	Sift old potting soil and sand.	Make leaf mould. Buy and sift manure. Sift leaf mould.	From June 20th sow Amaranthus, Bachelor's Button, Balsam, Caliopsis, Celosia, Chrysanthemum Cascade and Korean, Cosmos, Cuphea, Hollyhock, Marigolds, Petunias, Salvia Farinacea, Sunflower, Tithonia, Torenia, Vinca, Zinnia (all varieties) and plant out suckers or layers of Chrysanthemum Cascade and Korean, Cloud Grass, Michaelmas Daisy, Ruby Grass, Verbena Erinoides. Pot up shrub cuttings. Pot up self-sown cleome and Kochia seedlings.	Prune all shrubs and perennial creepers which flower throughout the year. Cut out the year. Cut old Thevetia or Tecoma hedges.	Prepare beds. Sow Chillies, Mint, Parsley, Roselle.

Gardening Calendar Month by Month—cont.

Month.

Propagation.

Vegetables.

Cultivation.

July

Complete any items of June not finished. Repot old Poinsettias. Pot up Carnations. Plant out Tu-berose. If not done earlier, divide Angelonia, Commelina, Michaelmas Daisies, Golden Rod, and pot up young portions for two or three weeks before planting out. Sow Ageratum, Carnations, Gail-lardia to flower in January.

Sow Artichokes, Beans Lima and Goa, Capsicum, Chilies, Cress, Cucumber, Ladies Fingers, Lettuce, Marrow, Mint, Parsley, Roselle, Snake Gourd, Spinach, Sweet Corn, Swiss Chard. Sow as for July plus Beetroots, Radish and Tomato.

August

Sow Coleus, Impatiens, Salvia Splen-dens. Take cuttings Coleus, Begonia. In *clay soils* plant out Carnas and from August 20th sow Dahlias.

Liquid manure flowering plants and mulch beds once a week.

September

Sow seeds on or soon after the fol-lowing dates to flower in Janu-ary:—

Sow (except Ladies Fingers) as for July and August plus Basil, Brinjal, Cape Gooseberry, and Carrot.

Top dress lawn with dried cowdung. Liquid manure flowering plants and mulch beds once a week.

In clay soils—

1st. Antirrhinum, Verbena annual varieties.

8th. Ladies Lace and Linaria.
10th. Alyssum, Aster, Chry-santhemum, Dianthus
Gladioli, Petunia, Phlox,
Salvia farinacea, Sweet Wivelsfield.

Gardening Calendar Month by Month—cont.

Month.	Propagation.	Cultivation.	Vegetables.
September (cont.)	<p>15th. Browallia, Calendula, Calliopsis, Cleome, Cloud Grass, Cornflower, Cuphea, Cynoglossum, Gypsophila, Heliotrope, Hollyhock, Hymenanthemum, Nicotiana, Portulaca.</p> <p>Plant out Cannas if not already done.</p> <p>In sandy and loamy soils—</p> <p>8th. Verbena annual varieties.</p> <p>15th. Antirrhinum, Dahlia, Ladies' Lace, Linaria, Phlox.</p> <p>18th. Chrysanthemum, Dianthus, Gladioli, Sweet Wivelsfield.</p> <p>25th. Gypsophila, Heliotrope, Hollyhock, Petunia, Salvia farinacea.</p> <p>30th. Alyssum, Aster, Browallia, Calendula, Calliopsis, Cleome, Cloud Grass, Cornflower, Cuphea, Cynoglossum, Hymenanthemum, Nicotiana, Portulaca.</p>		

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